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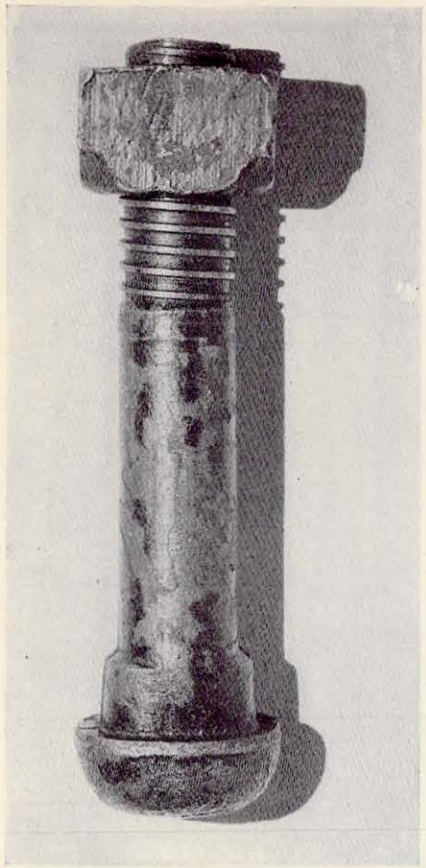

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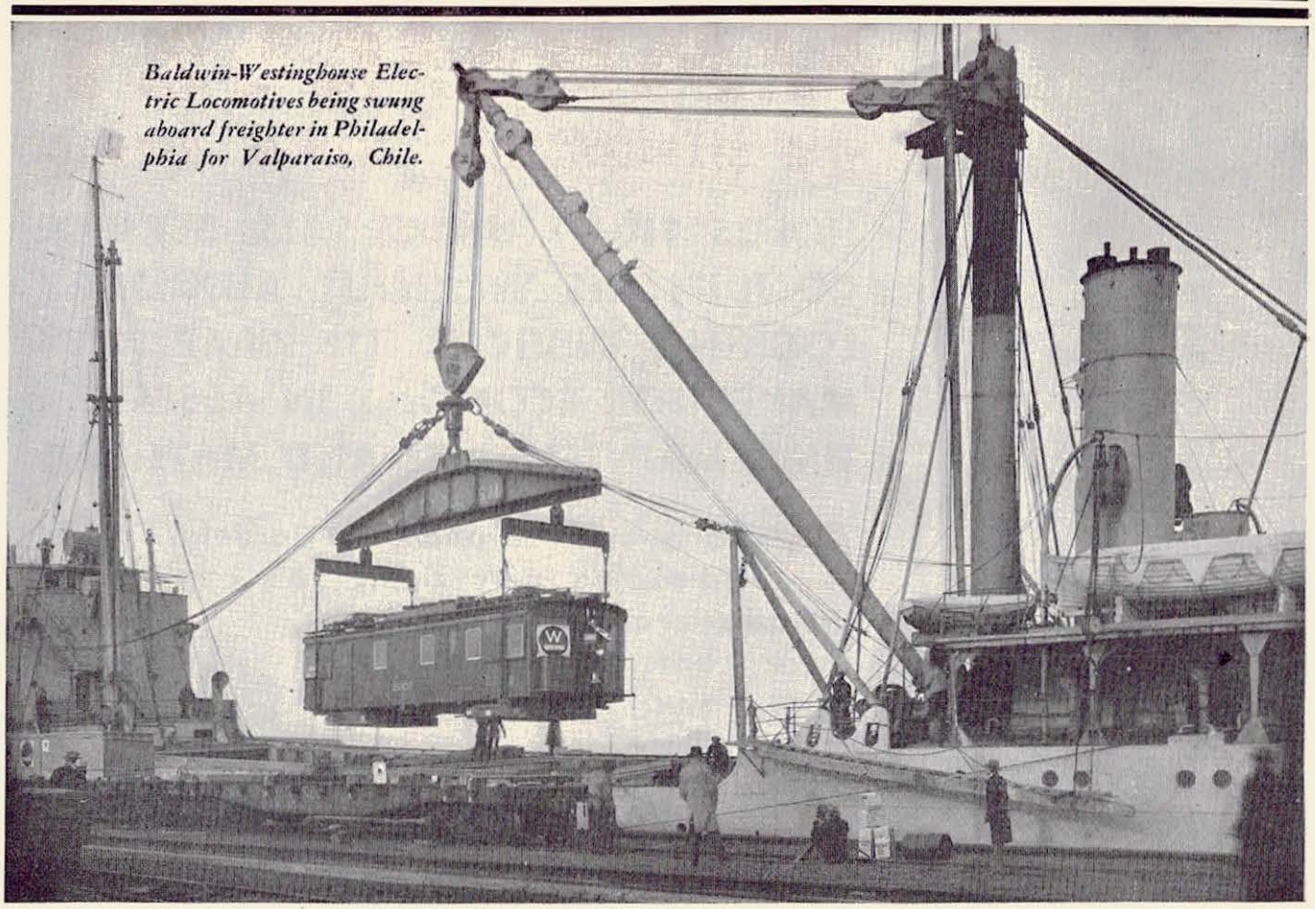
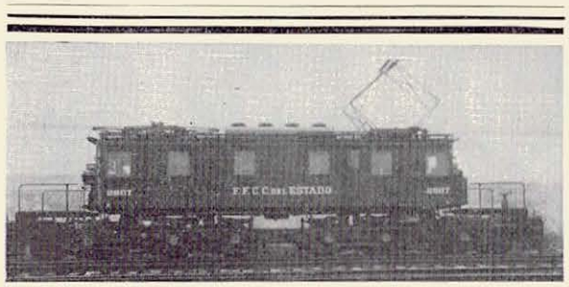


Baldwin-Westinghouse Electric Locomotives being swung aboard freighter in Philadelphia for Valparaiso, Chile.

8 *years ago today . . .*



One of the four Baldwin-Westinghouse Electric Locomotives being delivered to the Chilean State Railways.

ON January 3, 1923 the first of an order of thirty-nine Baldwin-Westinghouse electric locomotives for the Chilean State Railway was landed at Valparaiso. Enroute today for the same destination, are four 130-ton, Baldwin-Westinghouse locomotives, exact duplicates of the express passenger units delivered at that time.

The remarkable performance of these locomotives in Chile, and the fact that after eight years of service, the exact model has been duplicated, are fine tributes to the excellence of Baldwin-Westinghouse design and engineering.

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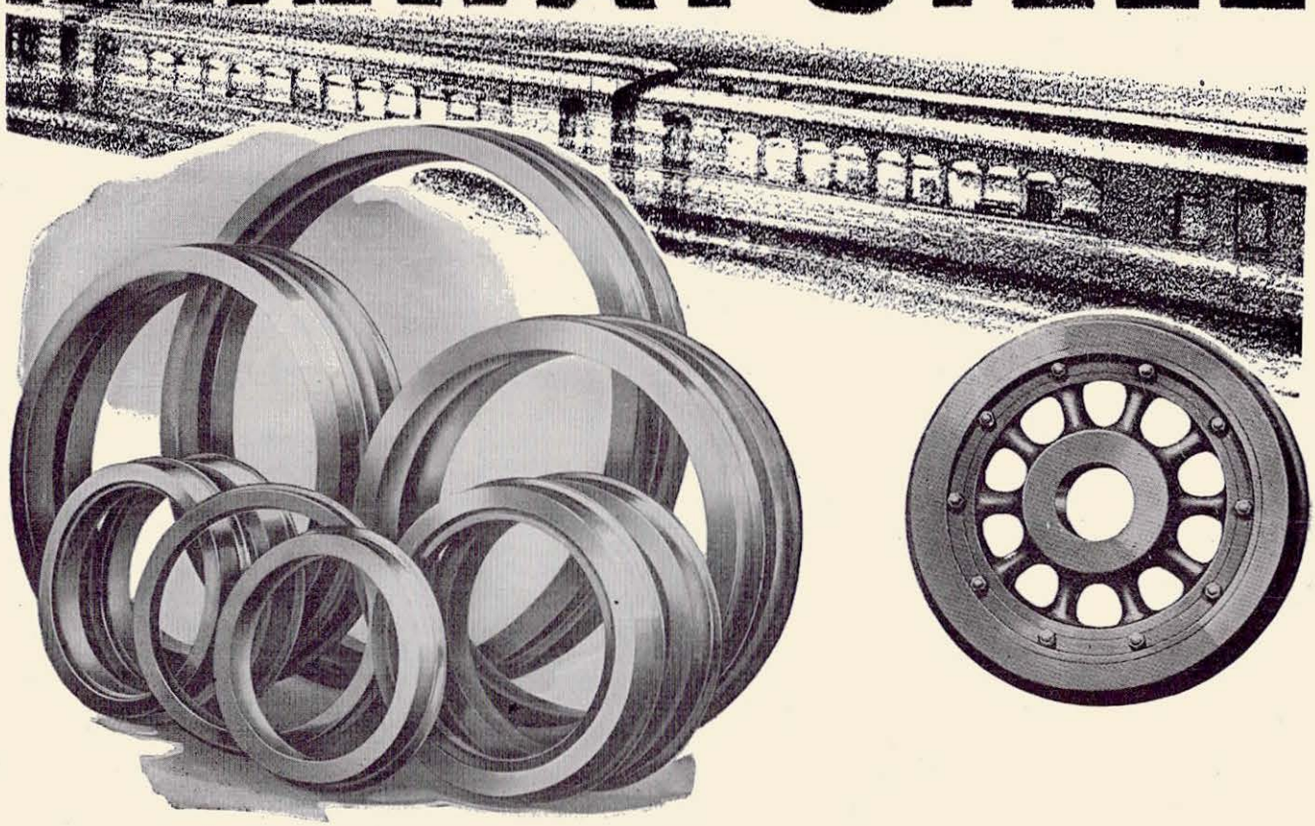

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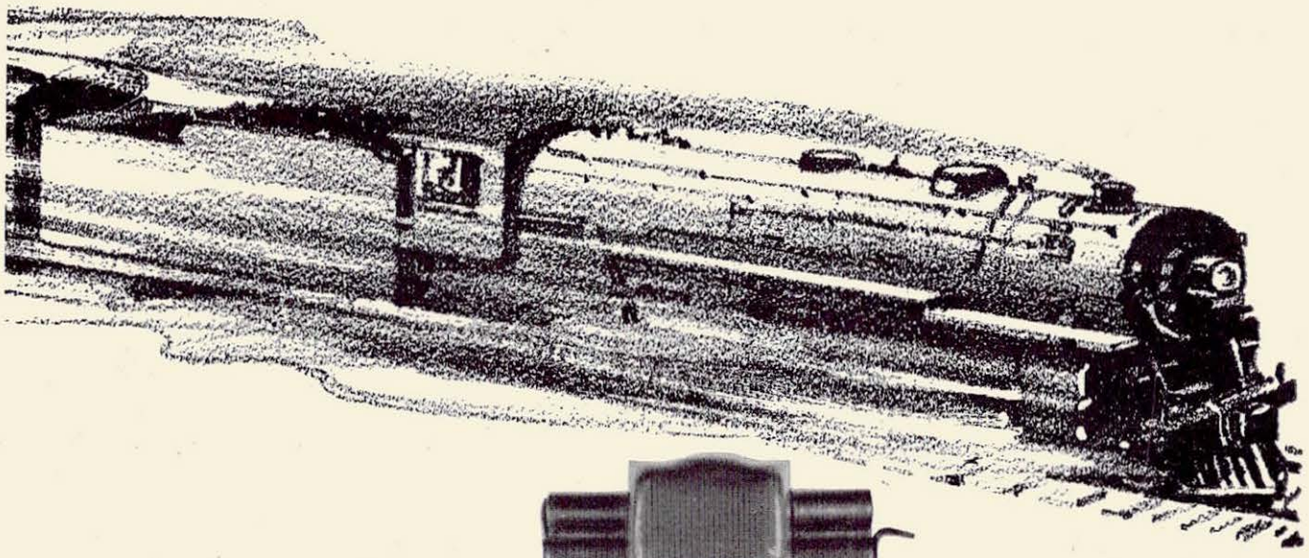
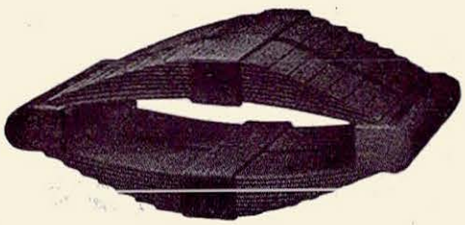
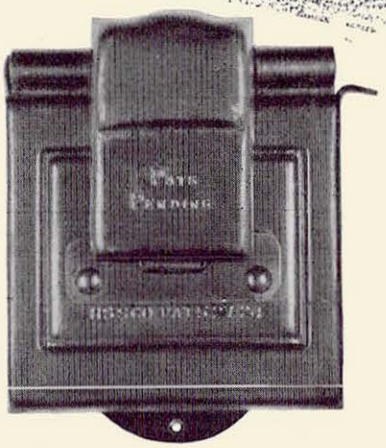
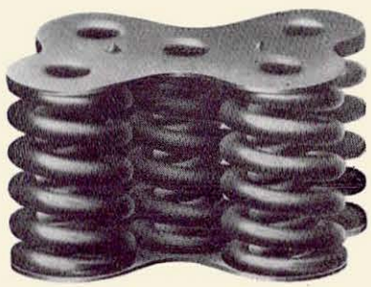
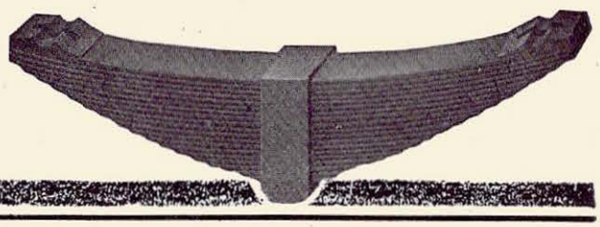






tion of achievement and service in this field. It stands today pre-eminent, and is acknowledged as the foremost manufacturer of these specialties.





Railway Steel-Spring Company

30 CHURCH ST., NEW YORK

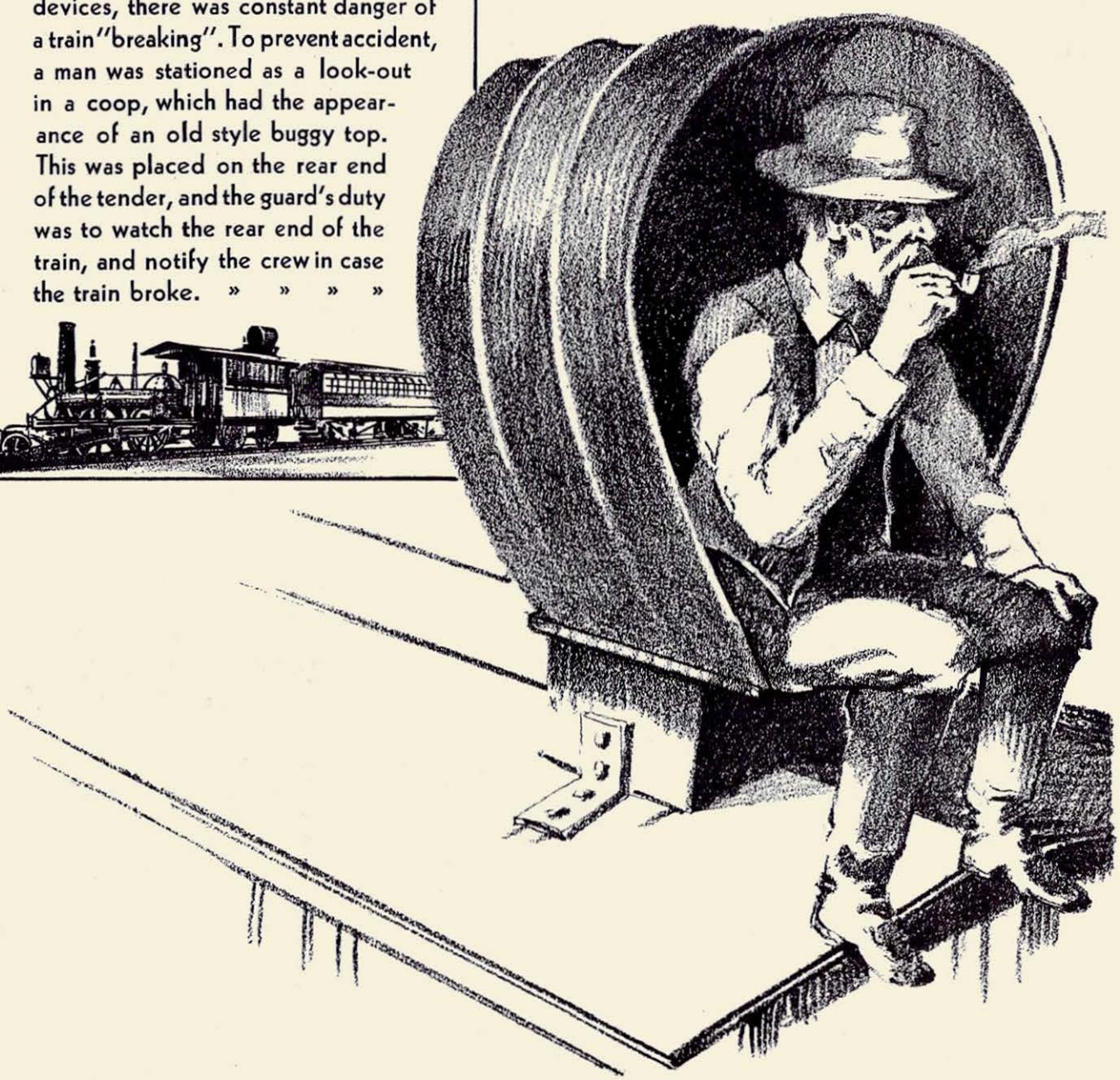
Branch Offices:

Chicago, Ill. Detroit, Mich. Richmond, Va. Pittsburgh, Pa. Montreal, Que.
St. Paul, Minn. Dallas, Texas. St. Louis, Mo. Denver, Colo. San Francisco, Cal.
Cleveland, Ohio

Railroading A Hundred Years Ago-

The LOOKOUT

Before the days of modern coupling devices, there was constant danger of a train "breaking". To prevent accident, a man was stationed as a look-out in a coop, which had the appearance of an old style buggy top. This was placed on the rear end of the tender, and the guard's duty was to watch the rear end of the train, and notify the crew in case the train broke. » » » »



CARDWELL DRAFT

TODAY

No lookouts are needed with the modern devices available.

Cardwell and Westinghouse Draft Gears protect knuckles and their couplers from breakage, and prevent damage to other parts of the car and to the lading by cushioning the smashing impact of heavily loaded cars.

Provide this needed protection by replacing inadequate draft gears with Cardwell and Westinghouse gears.

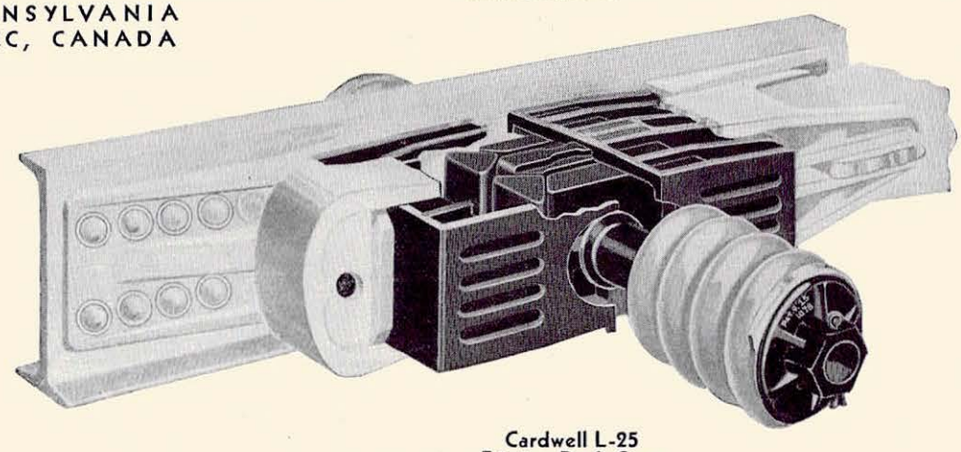
Westinghouse NY-11-D Friction Draft Gear

Westinghouse Draft Gears can be applied with any type of attachments.

CARDWELL
WESTINGHOUSE COMPANY
332 South Michigan Avenue -:- Chicago, Illinois
PITTSBURGH, PENNSYLVANIA
MONTREAL, QUEBEC, CANADA

Cardwell and Westinghouse Draft Gears

Are made in sizes and capacities to meet all modern and A. R. A. requirements for locomotives, freight and passenger cars.



Cardwell L-25 Friction Draft Gear

Cardwell Gears are made to fit any length of yoke or draft-gear pocket.

WESTINGHOUSE GEARS

For SERVICE AND DELIVERY

MAGNUS METAL

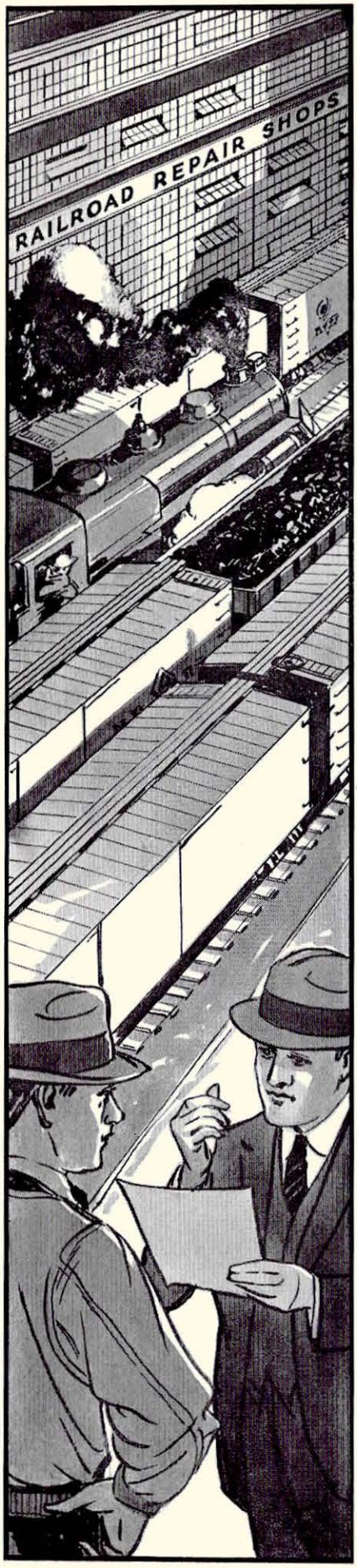
WHERE RECORDS ARE MADE YOU
WILL FIND MAGNUS PRODUCTS

"MAGNUS PRODUCTS ARE BRASS INSURANCE"

MAGNUS COMPANY

INCORPORATED

NEW YORK CHICAGO



PROTECT EARNINGS

TO PROTECT railroad earnings cars must be protected against damage. Repairs — or "maintenance of equipment" — consumes more than 24% of operating revenue every year.

National Draft Gears give maximum protection to cars under all conditions of service.

Due to advanced design and the use of superior material these draft gears have made an unequaled record in official tests and in service on thousands of cars.

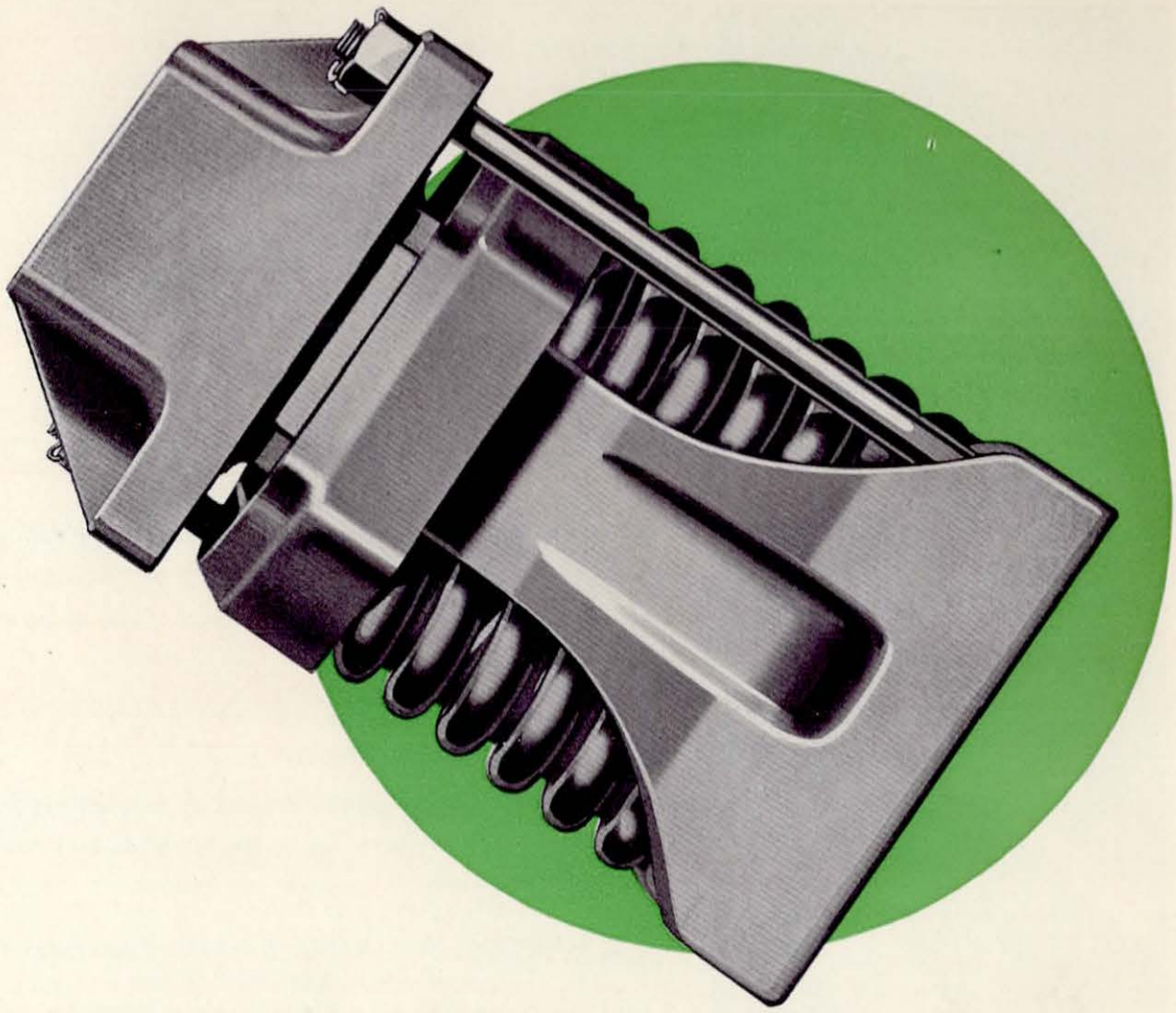
THE NATIONAL MALLEABLE & STEEL CASTINGS CO.
General Offices: CLEVELAND, OHIO
Sales Offices: New York, Philadelphia, Washington, Chicago, St. Louis, San Francisco
Works: Cleveland, Chicago, Indianapolis, Sharon, Pa., Melrose Park, Ill.

NACO STEEL
Trade Mark Registered

NACO Steel is a product of the electric furnace. Tougher and more resistant to shock and wear than any alloy ever before used in draft gear manufacture.

M17 National Draft Gear

NATIONAL
ELECTRIC NACO STEEL
DRAFT GEARS



TESTED AND PROVED ••

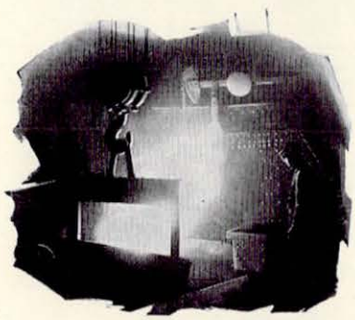
THE National M17 Draft Gear has been tested and its unequaled ability to provide maximum car protection has been proved.

The records of A. R. A. tests at Purdue University show that in the combination of those vital qualities necessary to successful draft gear performance the National M17 ranked first.

The facts developed in these tests are confirmed and proved by the records of National Draft Gear performance on thousands of cars in daily use on leading railroad systems.

NACO STEEL
Trade Mark Registered

NACO Steel is a product of the electric furnace. Tougher and more resistant to shock and wear than any alloy ever before used in draft gear manufacture.



THE NATIONAL MALLEABLE & STEEL CASTINGS CO.
General Offices: CLEVELAND, OHIO
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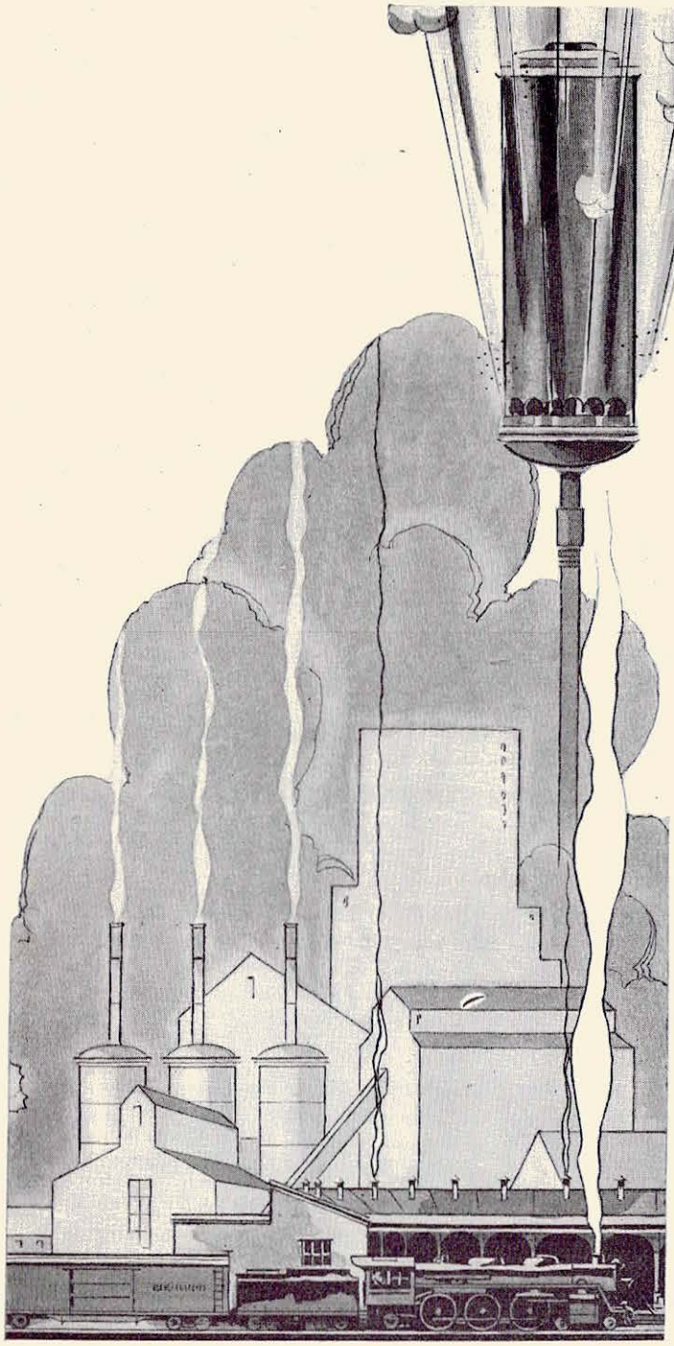
NATIONAL
ELECTRIC (N M&S Co.) NACO STEEL
DRAFT GEARS

NOW IS THE TIME TO BUY



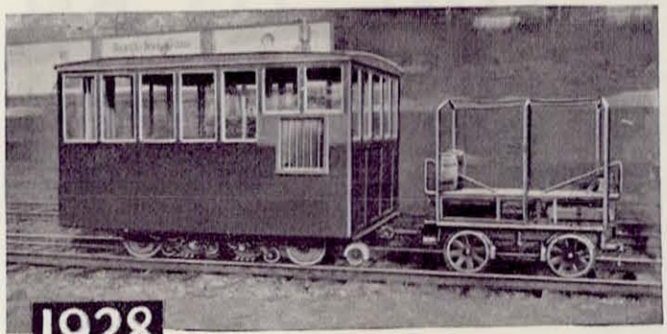
We believe in the advice given on every hand that now is the time to buy—providing the right thing is bought. Therefore, buy that which will last the longest—buy that which will do the greatest amount of work in service, with due regard to the first cost.

If all freight cars, like passenger cars, were equipped with Diamond-S Brake Shoes, substantial savings would be made.

The American Brake Shoe and Foundry Company

230 Park Ave., New York
332 So. Michigan Ave., Chicago

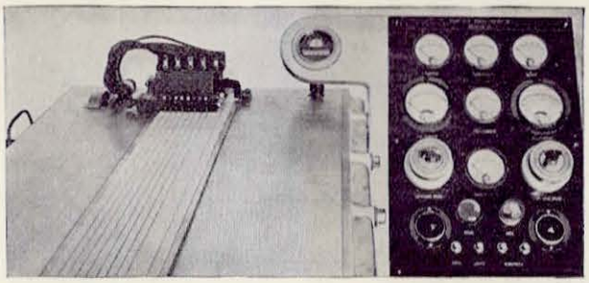
2 YEARS OF



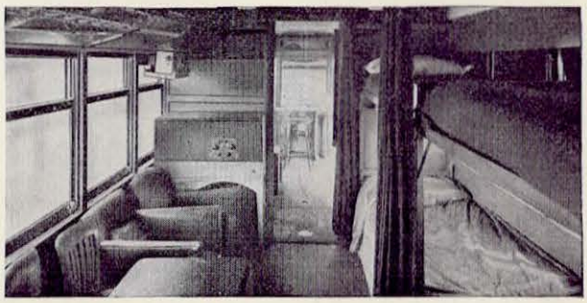
1928

Above, the original Sperry Detector Car is shown. Today, they are built in single and double types as illustrated on the opposite page.

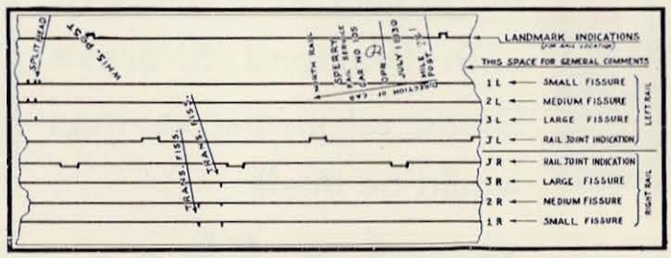
NEW PEN UNIT AND CONTROL PANEL



IMPROVED LIVING QUARTERS



THE NEW RECORD


LANDMARK INDICATIONS
THIS SPACE FOR GENERAL COMMENTS
1 L — SMALL FISSURE
2 L — MEDIUM FISSURE
3 L — LARGE FISSURE
J L — RAIL JOINT INDICATION
LEFT RAIL
J R — RAIL JOINT INDICATION
3 R — LARGE FISSURE
2 R — MEDIUM FISSURE
1 R — SMALL FISSURE
RIGHT RAIL

FISSURE GROWTH—Heavy axle loads and higher train speeds have been recognized as the cause of fissure growth. Transverse fissures that weaken rails until they break in service vary widely in size.

THE SIZE OF FISSURES—Statistics compiled from tests by Sperry Detector Cars show that 30% of the transverse fissures detected were less than 20% of the rail-head area, 30% were between 20% and 40% of the rail-head area and 40% were 50% or more of the rail-head.

MULTI-FISSURE RAILS—This most dangerous type of defective rail is of particular interest. Sperry tests show that 16% of defective rails due to transverse fissures had two or more fissures per rail.

WEIGHT OF RAIL—Transverse fissures have been found in all weights of rail. The large number of fissures found in 130 pound rail shows that fissures develop in heavy as well as light rail.

NON-VISIBLE FISSURES—During a test period of about 10,000 miles, ten Sperry Cars found that approximately 90% of all transverse fissures were absolutely non-visible. The remaining 10%, which showed hair-line cracks on very close inspection, were evidently not sufficiently visible to have permitted detection by track-walkers.

EDUCATIONAL VALUE—This is a feature where Sperry tests have a definite value in connection with track maintenance as shown by knowledge of rails and defects gained by track forces while on Sperry Cars.

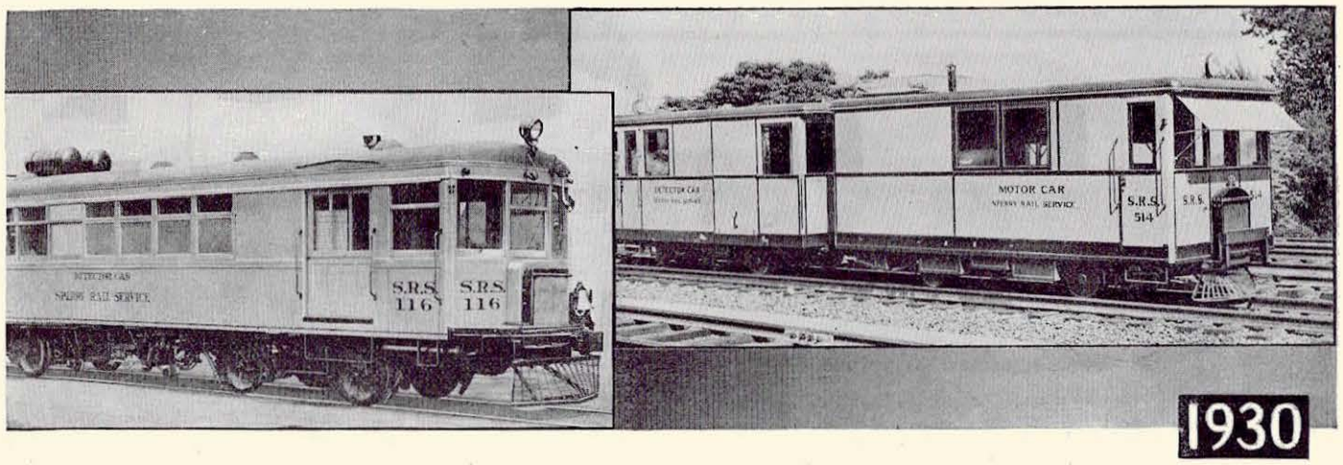
MAINTAINING SPERRY CARS—An operating department and field supervisors carefully follow the operation of each car. Detecting equipment is inspected daily on the cars and in addition goes to the Sperry laboratories for periodic testing, calibration and improvements. Improved equipment, resulting from continuous research keeps Sperry Cars up-to-date and highly efficient.

SPERRY PRODUCTS INC.

SPERRY

SPERRY PRODUCTS, INC.

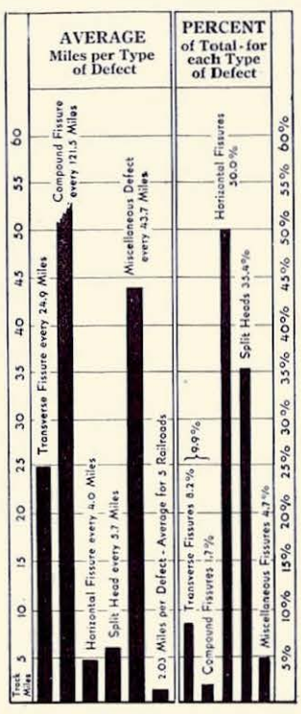
SIGNIFICANT PROGRESS . . . .



Testing Equipment Improved . . . Danger and Expense Minimized

IN NOVEMBER, 1928 Sperry Rail Service found its first fissure while testing for a railroad. Since then, development has been rapid. At the close of 1930, Sperry Rail Service has a fleet of ten modern, highly efficient cars operated by Sperry crews. They have completed a busy year of rail testing for the leading railroads of the country.

■ During 1930, Sperry Detector Cars have been still further improved. Rail joint indications have been eliminated from the record. Fissures close to rail joints are now accurately detected. A new searching unit minimizes the effect of surface defects on the record, improving testing results. Changes in equipment facilitate testing in winter. Other improved devices increase operating efficiency and assure greater accuracy of testing equipment.



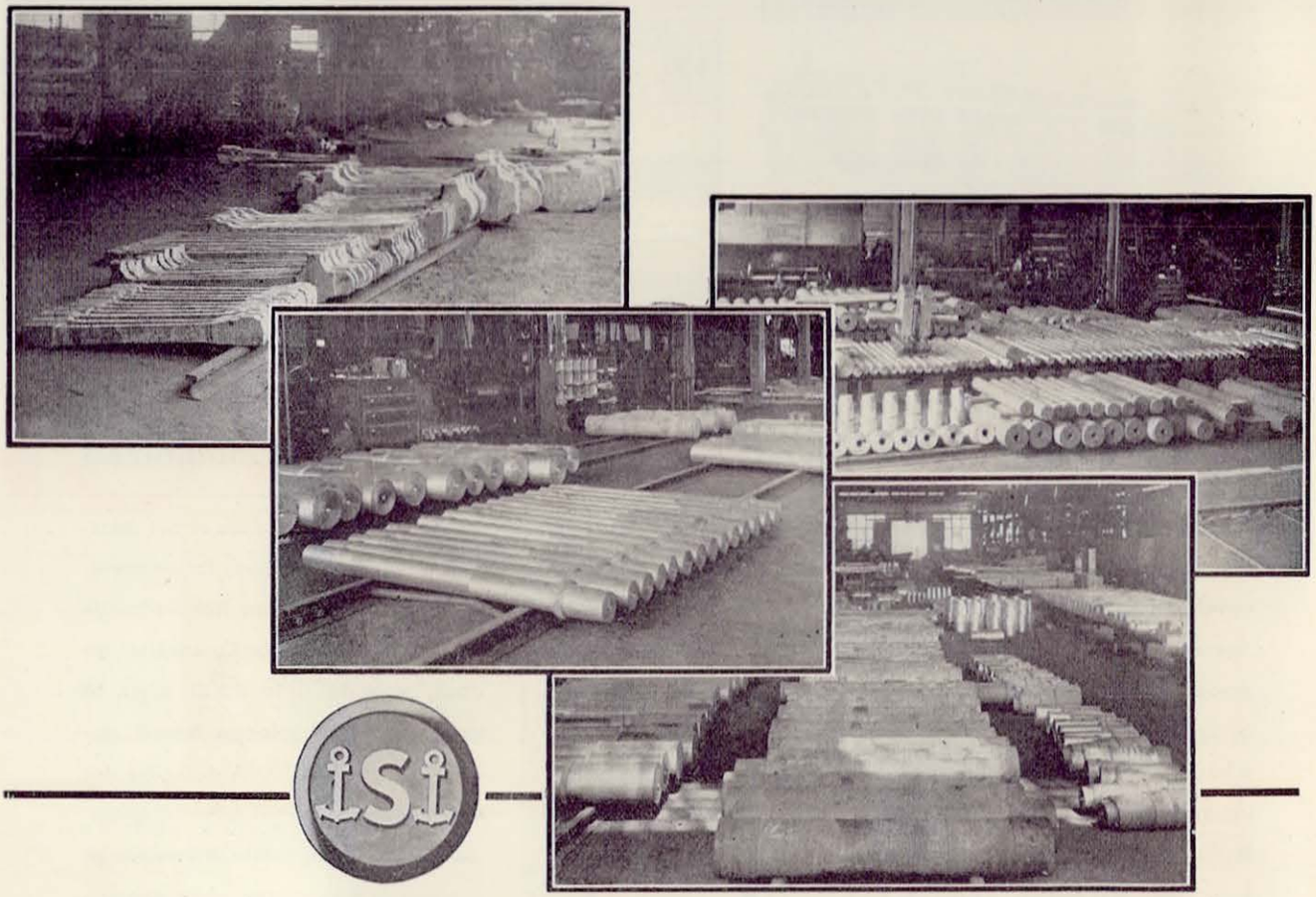
■ Tests have revealed interesting data about internal rail defects. The two charts shown, for example, give combined averages of tests on five railroads where Sperry Detector Cars tested, on each, from 1500 to 4500 miles of track. The total mileage tested was approximately 14500. A defective rail was found every 2.03 miles. Approximately 10% were either transverse or compound fissures, the most dangerous types of defects. Testing by Sperry Rail Service made it possible to locate and replace these rails before fracture occurred.

■ By systematically employing Sperry Rail Service as part of track maintenance programs, railroads can reduce to a minimum the danger and expense resulting from broken rails.

RAIL SERVICE

Sperry Bldg., Manhattan Bridge Plaza, Brooklyn, N. Y. Chicago Office: 80 East Jackson Blvd.

STANDARD



"Quality comes first"—

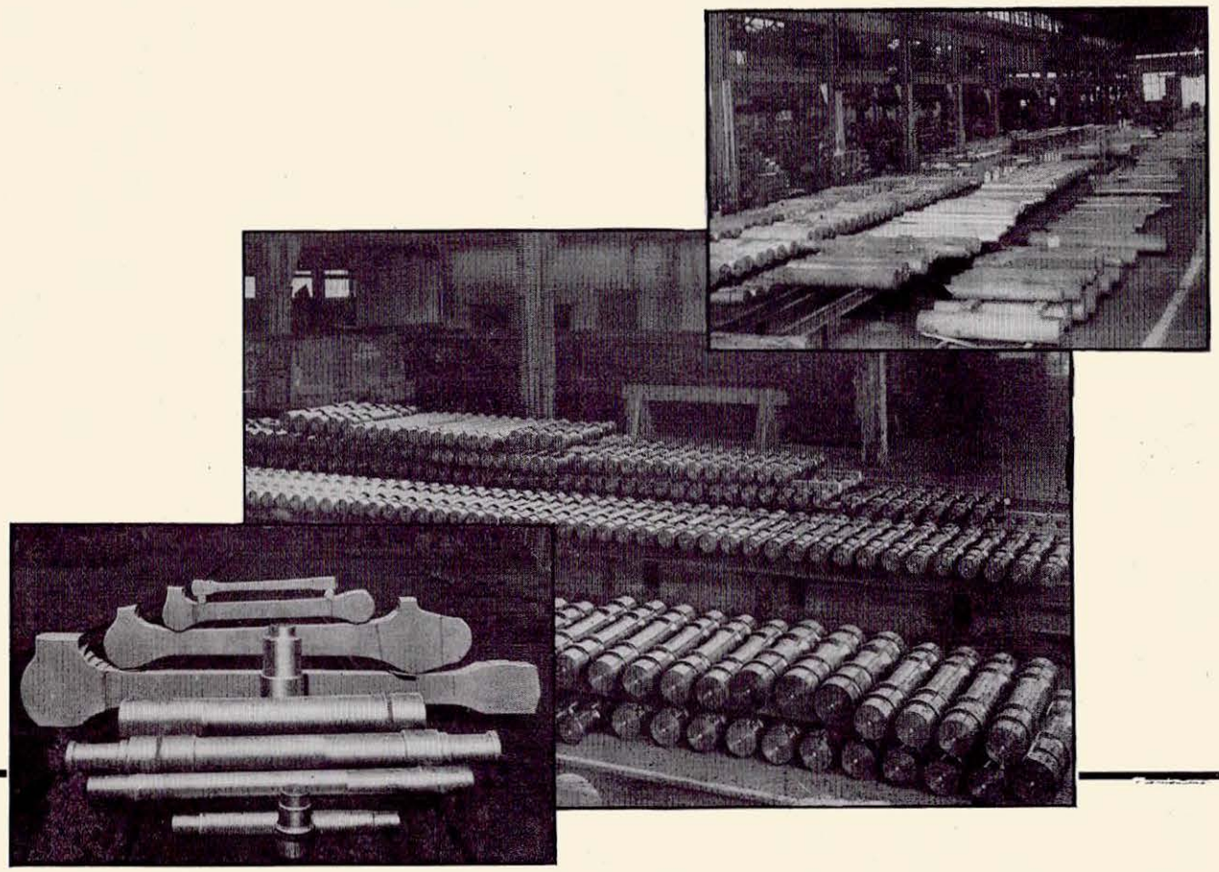
—in making Standard Steel Works Forgings. The satisfaction of all Standard Steel Works customers is ample evidence of this fact.

STANDARD STEEL WORKS COMPANY

GENERAL OFFICES AND WORKS: BURNHAM, PA.

Chicago Richmond St. Louis Portland
New York Philadelphia San Francisco

STEEL



—Quantity is sure to follow

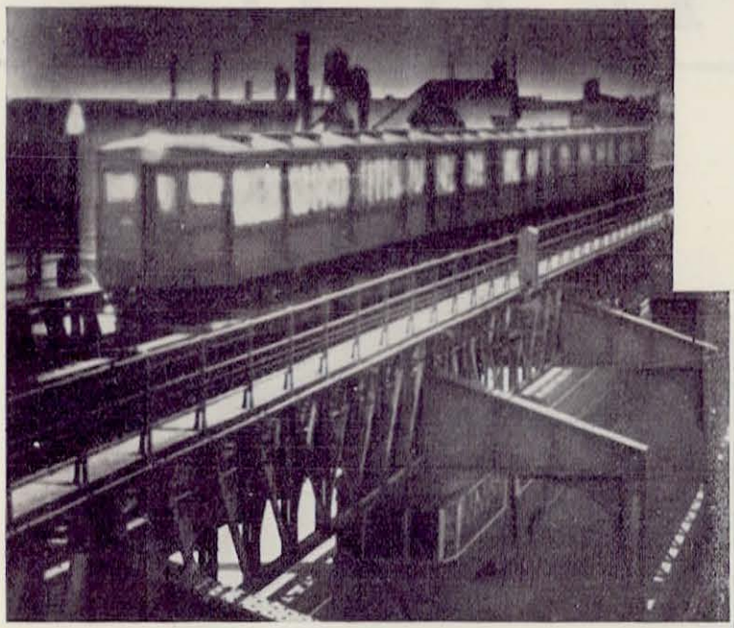
Where quality stands out, there is bound to be increased demand. Our quantity production is another proof of quality in product.

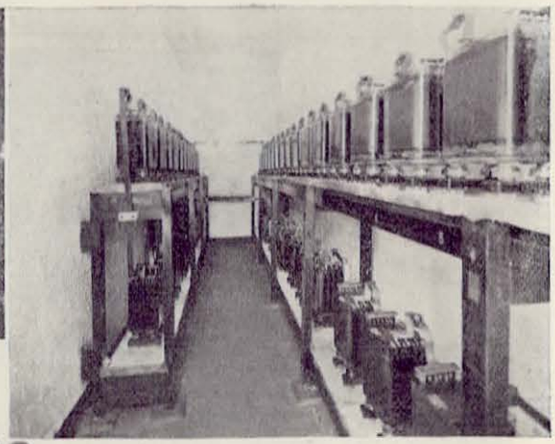
STANDARD STEEL WORKS COMPANY

GENERAL OFFICES AND WORKS: BURNHAM, PA.

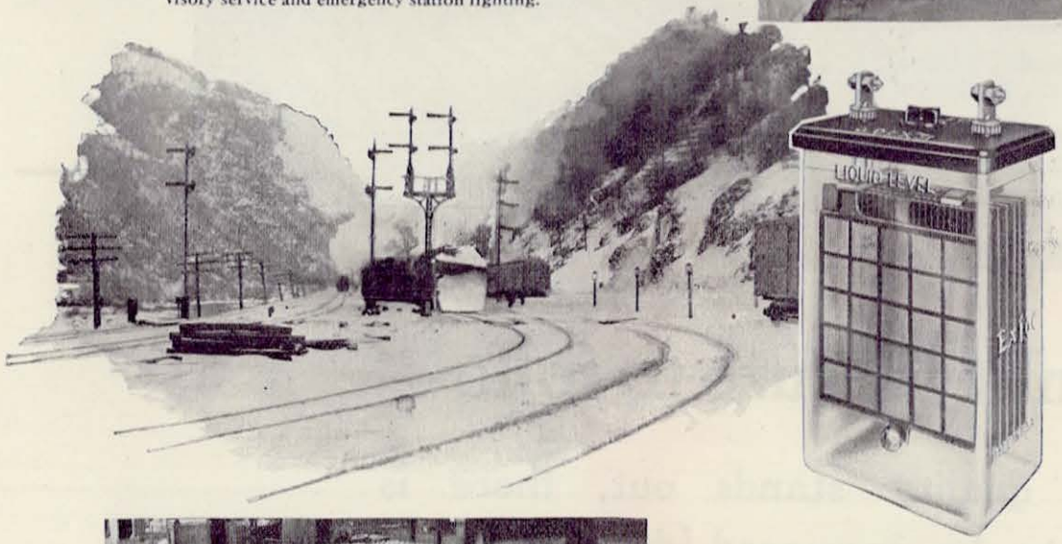
Chicago Richmond St. Louis Portland
New York Philadelphia San Francisco

NO MATTER WHAT THE JOB *Dependably*





Following the lead of the great majority of power and light companies, many railroads have installed Exide Control Bus Batteries in substations. These batteries have proved to electrical engineers their outstanding qualities as units for control bus service, supervisory service and emergency station lighting.



18 years' continuous reliable service. That was the record of the Exide-Chloride type battery in this interlocking plant. The Exide-Chloride battery with its unique construction is the ideal battery for such service its surprisingly long, active life brings the cost of this battery to almost an irreducible minimum. And maintenance is most simple and economical.

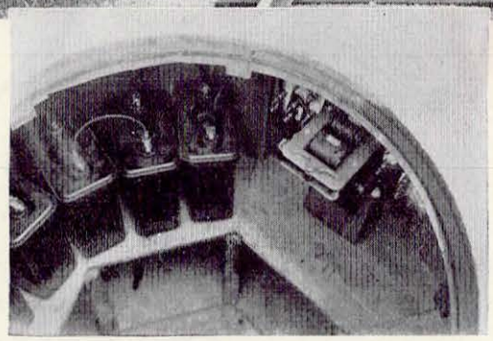
Battery-Oil-Electric Locomotives require a storage battery of absolutely proved ability and economy. Exide-Ironclad Batteries have all the characteristics necessary for correct operation of these units and have been found most practical and economical as well as dependable in every sort of work in which such locomotives are used under any and all conditions.

THE WORLD'S LARGEST MANUFACTURERS OF STORAGE BATTERIES FOR EVERY PURPOSE

there's an Exide Battery built to do it and Economically

ON these pages you will see several uses of Exide Batteries. There are many other important applications. But space prevents our going further into the subject. Let it suffice for us to say that there is an Exide for every application. And that every Exide is backed by the 43 years' experience of the world's largest manufacturers of storage batteries for every purpose.

Automatic block signals along thousands of miles of track operated by American railroads are guarded by Exide Batteries. Exides guarantee accurate, dependable operation of signals and at the same time bring down maintenance costs. And the exceptionally long life of Exide Batteries makes them a most economical purchase for railroads.



More Exide Car Lighting Batteries were purchased last year than all other makes combined. The same advantages that were the reasons for this overwhelming acceptance are present in the new Exide-Ironclad Car Lighting Battery *plus* many improvements and refinements which will be an important factor in bettering car lighting service and lowering car lighting costs.

Speedy handling of baggage and freight with electrical industrial trucks depends upon the power unit. Exide-Ironclad Batteries are recommended for this service. Their stamina, efficiency, power and economy have been proved over a period of many years' service in thousands of industrial plants and railroad shops.

Exide

BATTERIES

FOR EVERY RAILROAD USE

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia *Exide Batteries of Canada Limited, Toronto*

First

EXHAUSTIVE RESEARCH

by General Electric scientists and engineers

Then

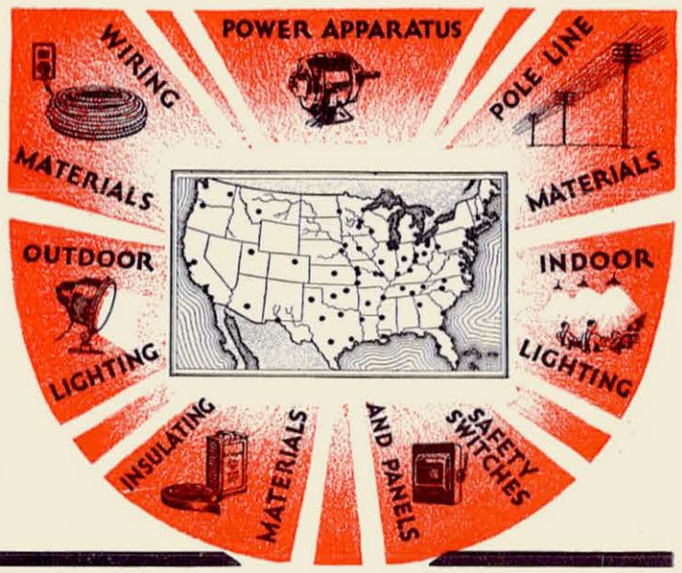
EFFICIENT PRODUCTION

in General Electric and associated factories

NOW

ECONOMICAL DISTRIBUTION

of a complete line of electric apparatus and supplies, from more than 80 wholesale warehouses, to every community in the United States.

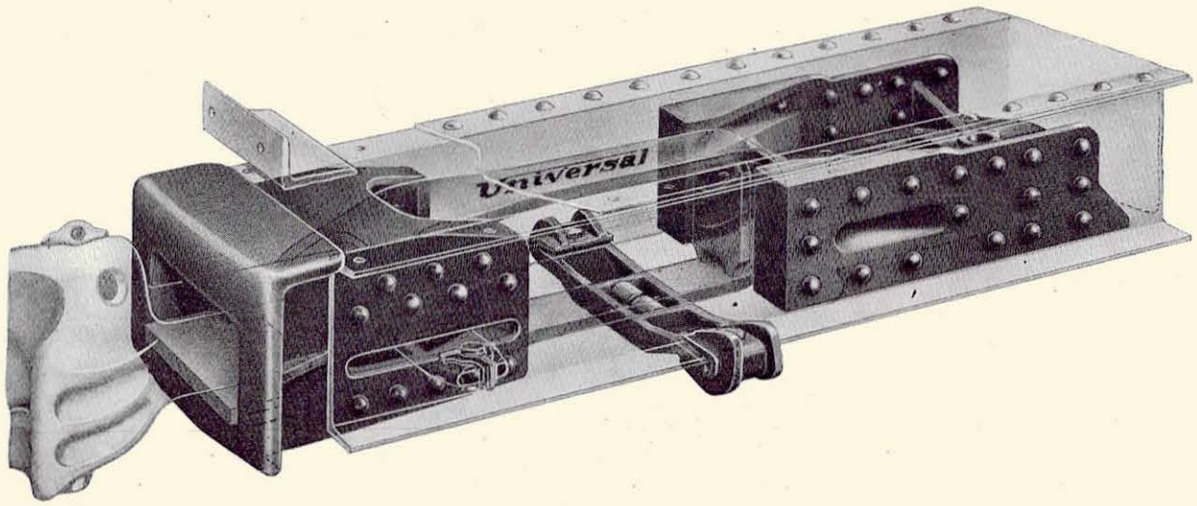


GENERAL ELECTRIC

SUPPLY CORPORATION

Universal

DRAFT ATTACHMENTS



The *Universal* Draft Attachments are interchangeable with ARA and made to suit any design of car or make of draft gear.

BUFFERS—If required will be made to suit centering device; integral with front lugs or separate. If regular form with carrier iron integral, the **wear plate** will be from "*Universal* Alloy Steel" having long wearing qualities.

BOLSTER CENTER FILLER—combined with rear lugs or separate.

YOKES—*Universal* rear end box section providing maximum strength.

DRAFT KEY RETAINERS—"U" type having greatest possible wear surface top and underside of key. (ARA type will be supplied if desired)

DRAFT GEAR CARRIER—*Universal* of roller type (illustrated above) held in position with regular brake pin; may be easily and quickly removed or replaced. No wear on yoke.

DRAFT LUGS—*Universal* XL extra long fold type at rear; thimbled through sill providing strongest possible construction at front.

Universal Draft Gear Attachment Co.

332 S. Michigan Avenue, Chicago

Royal Bank Building, Montreal, Canada

Freight can be handled FASTER

LIFT TRUCKS *A special type developed by Elwell-Parker for handling the new merchandise containers, which many railroad men believe will revolutionize freight handling.*

LIFT TRUCKS *Scores of jobs await them in every terminal. They travel three times as fast as a hand trucker usually walks, carrying eight to twenty times the load. You can figure the savings for yourself. Elwell-Parker Electric Lift Trucks are made in 1¾, 2, 3, 5, 8 and 10 ton capacities. They can also be used to pull, as well as to lift and carry.*

TRACTORS *Especially economical for long hauls. Built in three and four wheel types, 1 to 15 tons trail load capacity.*

FORK TRUCKS *Many terminals are using this type of truck to particular advantage for handling bagged material, bales, bundles and miscellaneous packages. Sizes vary from 1 to 4½ tons.*

. . . . in BIGGER UNITS . . . . and at LOWER COST . . . with Electric Trucks

MANY freight handling problems similar to your own have been solved by Elwell-Parker Field Engineers.

The first Elwell-Parker Electric Truck, built more than 25 years ago went into railroad service. Continually, since that time Elwell-Parker has worked with railroad men in the development of more economical methods of handling. Elwell-Parker Field Engineers think as railroad men think. As a result Elwell-Parker Electric Trucks are designed with the needs of the railroads in mind. The trucks are built to railroad standards. They carry exclusive operating and safety features which appeal to railroad officials.

There are 39 standard types and sizes of Elwell-Parker Electric Trucks. Five are pictured here.

Your nearest Elwell-Parker Field Engineer will be glad to supply full details without obligating you in any way. Call him or write The Elwell-Parker Electric Company, 4250 St. Clair Avenue, Cleveland.

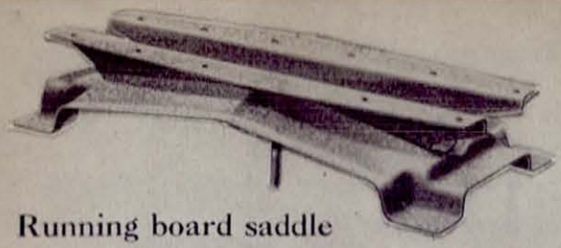
CRANES *For handling the unusually heavy and bulky loads that cause labor costs to mount, tie up cars, and make special switching necessary. Elwell-Parker Electric Cranes can be operated inside a freight car. Booms can be swung over gondolas from rail and platform level. Sizes from ½ to 3 tons capacity.*

"Handling and Shipping On Skids" is a new booklet we will be glad to send without obligation to operating officials. 16 pages. 75 photographs. A complete pictorial review of skid handling operations. Brimming with ideas. Send for it.

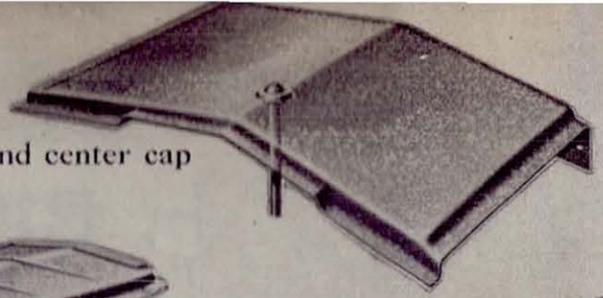
TIERING TRUCKS *Highly important for saving space in the to-be-called-for section. Skid loads, tiered, with this truck take only one-third the space required by trailers. There are 10 types of Elwell-Parker Electric Tiering Trucks. Two to 17½ tons capacity.*

ELWELL-PARKER

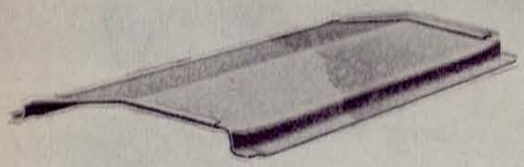
Designers and Builders of Electric Industrial Trucks, Tractors and Cranes for a Quarter Century



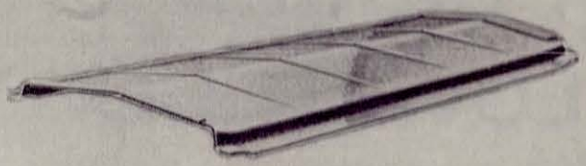
Running board saddle



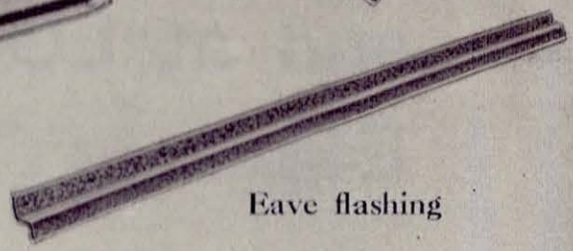
End center cap



End ridge cap



Intermediate ridge cap



Eave flashing

UNIVERSAL DRY LADING ROOF

the one standard roof that fits all roof standards

is capable of saving the railroads millions of dollars annually.

The Universal Dry Lading Roof is so adjustable that it does what it takes thousands of other roofs to do.

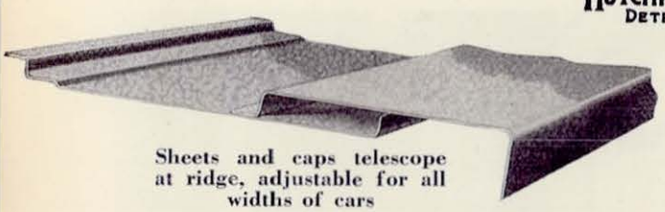
Think what this means in dollars and cents saving. Less capital is tied up in stock parts, less store room space is required and quicker car repairs are made with big savings in labor.

A Universal Dry Lading Roof consists of only 9 parts —each of ***one*** size and ***one*** design. These parts when used in correct combination will roof any width, any length, any type, or any design new or old house car.

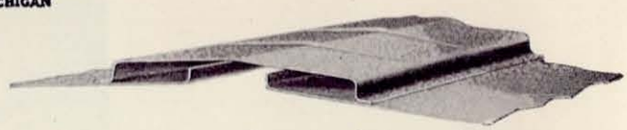
The following table shows how many parts are required for 36′, 40′ and 50′ cars.

Length of Cars	36′	40′	50′
Intermediate sheets	22	24	30
End sheets	4	4	4
Intermediate transverse caps	24	26	32
End transverse caps	4	4	4
Intermediate ridge caps	11	12	15
End ridge caps	2	2	2
Eave flashings	12	14	18
Running board saddles	12	13	16
End center caps	2	2	2

HUTCHINS CAR ROOFING COMPANY
DETROIT MICHIGAN
Established 1880



Sheets and caps telescope at ridge, adjustable for all widths of cars



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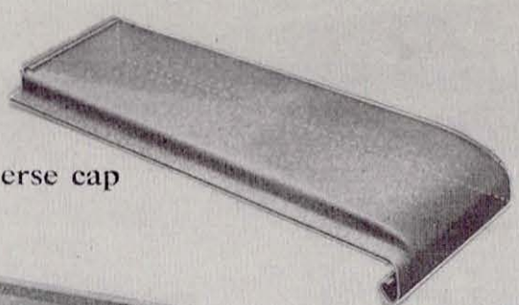
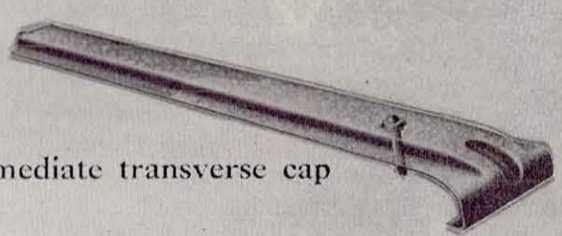
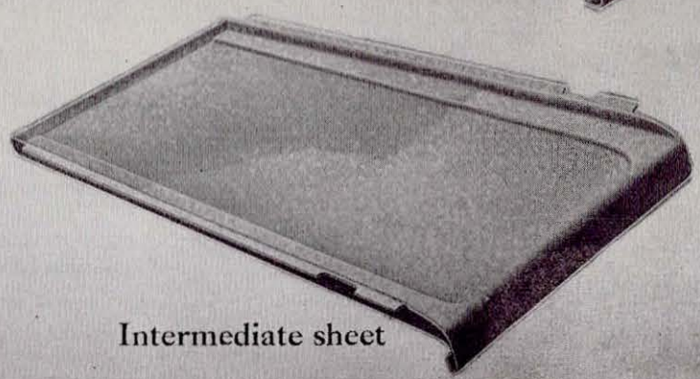


End transverse cap



Intermediate transverse cap

End sheet



Intermediate sheet

RAILWAY AGE

RAILWAY DEVELOPMENTS IN 1930

By the Editor

The railroad year 1930 was a disappointing one. A decline of traffic and earnings was expected. It was hoped, however, at the beginning of the year that the depression would be a minor one and would not last long. This hope was encouraged by concerted efforts made by business leaders, on the initiative of President Hoover, to cause various large industries and the national and state governments to make increased expenditures upon permanent improvements.

The railway industry pledged itself to increase its capital expenditures, and did so. Its expenditures for new equipment and additions and betterments in the first nine months of the year totaled almost $700,000,000, an increase of $125,000,000 or 22 per cent, over the same period in 1929, and of almost $200,000,000, or 40 per cent, over the same period in 1928. During the early part of the year the decline of traffic was not much larger than had been apprehended, and most of the roads did not drastically curtail their maintenance expenditures. Traffic continued, however, to decline month by month at a constantly accelerating rate, and practically all railways in the second half of the year adopted policies of drastic retrenchment in maintenance.

Despite these retrenchments the year's net operating income was about one-third less than that of 1929, and yielded a return upon property investment of only about 3½ per cent, or less than in any year since 1921.

Prospects in 1931

Elsewhere in this issue there is published an article in which the presidents of most of the leading railway systems give their views regarding the probable traffic of 1931. The consensus of their opinions is that the volume of business will be smaller in the first half of 1931, and larger in the second half, than in 1930. Some of them anticipate a total year's business larger than that of 1930, because they anticipate a substantial increase in the latter part of the year. These views are in accord with experience. The volume of freight business in the last quarter of last year was relatively smaller than in any earlier part of the year. Experience indicates that a tendency of traffic to increase in the latter part of a year forecasts a continuing increase in the early part of the next year, while a declining tendency in the latter part of a year usually forecasts poor business during the early part of the next year, but a probable upturn in the latter part of it.

The reason should be obvious. Since the effects of the panic of 1893 passed, there has never been a business depression in this country which lasted longer than a year and a half. After the depression of 1921 car loadings began to show more than seasonal increases after having shown more than seasonal declines for fourteen months. In the present depression car loadings had shown more than seasonal declines for fifteen months at the end of 1930.

The Problems of the Railways

The prolongation of the present depression seems to have been due as much to psychological as to economic causes. Belief that it would soon pass was so general and strong that it caused a premature advance in the stock market in the spring of 1930. The subsequent deepening of the depression caused unusual disappointment and pessimism, which undoubtedly prevented business men from initiating policies conducive to a return of prosperity which would have been initiated but for the widespread disappointment. A revival of general business can hardly fail, in view of past experience, to begin in the near future, and this will be speedily followed by an increase of railway traffic.

The railways face new problems. They will continue to face them after general business begins to revive. One of the most serious is the competition of other means of transportation, which was rapidly increasing before the depression began and undoubtedly produced relatively more effect on railway freight traffic last year than during any preceding year.

The way in which transportation by highway and waterway is being subsidized and inadequately regulated by the national and state governments often has been pointed out in these columns. The only encouraging feature of the situation is that the Association of Railway Executives and the principal railway labor

organizations have definitely adopted programs demanding fair play for the railways. Railway employees have become as much concerned about the effects of competition upon their employment as have railway executives regarding its effects upon traffic. Neither the railways nor the labor organizations are seeking to destroy any other form of transportation. What they are demanding is that the state and national governments shall treat all means of transportation alike in order that the railways may compete with others upon equal terms.

State of Public Sentiment

The state of public sentiment toward the railways is of more importance to them now than ever before. They must get more favorable regulation if they are to solve the problems with which they are confronted, and they must have the support of public sentiment if they are to get it. On the whole, public sentiment is unprecedentedly favorable. A large part of the public realizes that the railways have been badly treated; that their present condition is serious, and that constructive measures must be adopted to improve it.

It is impossible, however, to advocate any constructive measure without immediately arousing opposition in some quarters. When the railways ask that higher charges shall be imposed upon motor coaches and trucks for the use of the highways, and that highway service and rates shall be regulated as those of the railways are, they are at once charged by those who are financially interested in highway carriers with using propaganda to "destroy" competing transportation. When they ask that subsidies raised by taxing the public shall cease to be given to carriers and shippers by water, they are immediately threatened with reprisals. The Rivers and Harbors Congress on December 10 adopted a resolution in which it said: "We regret and deplore the efforts of the railroads to take advantage of present conditions to intensify their unwarranted attacks upon waterways. * * * The policy of improving rivers and harbors in order that transportation by water may be available for commercial use to augment and supplement transportation by rail and a broad national program to carry out such a policy have been approved by the American people and adopted by their representatives in Congress, and no efforts from whatever source to defeat or delay that program will be tolerated by the people of our country." The Wall Street Journal, in its issue of December 17, referred to "a definite reaction against railroads' opposition to federal appropriations for development of inland waterways" among members of Congress. "While the railroads do not appear to be stopping waterways extensions," says the Wall Street Journal, "they are making enemies for themselves."

A Difficult Situation

The situation is an extremely difficult one to deal with. Even the waterway enthusiasts composing the Rivers and Harbors Congress state they "have always advocated and urged every needed protection for the railroads." Never have those who discuss the railroad situation from their various points of view been so nearly unanimous in saying that the railroads must be fairly treated and their earnings and service maintained. At the same time, never were so many different kinds of efforts to divert traffic from the railways, and by this and other means reduce their earnings and destroy their credit, being made. If all those who earnestly profess to be friends of the railways should get done all the things affecting the railways which they are trying to get done, the industry soon would be bankrupt and there would be no escape from government ownership.

In the circumstances, there seems only one thing that the railways can do. If they courageously advocate policies needed to protect the industry they will be opposed and attacked. If they do not do so, nobody else will, there will be no change in these policies, and the railroad industry will come to disaster.

As a matter of self preservation they must advocate what they regard as sound and necessary and take their chances with public sentiment. A public sentiment that can be kept friendly only by abstention from opposition to ruinous policies is valueless.

Fortunately, the danger of creating adverse sentiment is not so great as it may appear to be. The existence of a widespread sentiment against the use of the highways by motor coaches and trucks under present conditions is shown by comments of the press throughout the country. The sentiment in favor of extensive development of inland waterways is very strong, and the railways incur more danger of reprisals by opposing waterway development than by opposing economically unjustifiable highway policies. But public sentiment regarding inland waterways is far from unanimous, and can be made still less nearly so by full discussion.

Competition Between the Railways

In opposing the continuance of certain unwise and harmful policies the railways now have the backing of the railway labor organizations, which apparently will prove of great importance; and apparently the public can be relied upon to be helpful if convinced, first, that the railways are in danger of not being able to maintain adequate earnings and satisfactory service, and, secondly, that all they are asking for is fair play—that is, the adoption of government policies that will treat them and their competitors alike and thereby enable them to compete on equal terms with other means of transportation.

There was much discussion last year of the effects of competition between the railways themselves. The facts regarding "reciprocal buying" were elicited in public hearings by both the Federal Trade Commission and the Interstate Commerce Commission. The testimony showed that the practice of railways using their purchases to influence traffic, and of shippers using their traffic to influence railway purchases, is widespread, but that it is disadvantageous to the railroads as a whole, and often very closely approaches rebating.

The question as to what should be done to relieve the traffic officers of individual roads of fear of the big shipper and prevent the consequent adverse effects upon railway revenues was much discussed. Traffic officers have not welcomed the suggestion that the railways as a whole or by groups shall create "rate czars" who could advocate advances or oppose reductions of rates without fear of the traffic club of the big shipper. Traffic officers themselves, however, have as yet failed to offer any constructive suggestions for remedying a bad situation which they all admit exists.

One suggestion which has been offered has been that legislation should be adopted depriving shippers of the power to route the movement of their traffic beyond the line of the initial carrier. This suggestion has been denounced as if it were a proposal to deprive the shipper of an inherent property right, whereas, in fact, it is a legal right he never had until the passage of the Hepburn act in 1906.

Efficiency of Operation

The service of the railways was never as good as in 1930, nor, considering the conditions, was the efficiency of their operation ever greater. The average number of cars per freight train increased, although, because of a decline in average car loading, the average number of tons per train declined. Average miles per freight train hour set a new high record. The consumption of coal per one thousand gross ton-miles set a new low record.

The reduction of expenditures for maintenance was, however, relatively much greater than the reduction of transportation expenses. This, of course, is a sure sign of retrenchments, rather than of economies. Railway executives are virtually unanimous in saying that the reductions in maintenance thus far have not caused any considerable deterioration of the physical properties, but are almost equally unanimous in saying, in an article published elsewhere in this issue, that such retrenchments cannot be much longer continued without injury to the properties and deterioration of service.

Huge Reduction of Operating Expenses

Total capital expenditures upon new equipment and additions and betterments last year were the largest since 1923. This was the first year in railroad history when such relatively large expenditures were made in a period of depression. Undoubtedly their general effect will be conducive to operating economies in future.

That capital expenditures will be reduced in 1931 is reasonably to be expected, and is forecasted by most railway executives. The need for operating economies is, however, greater than ever, and, although a large majority of roads have less of both cash and credit than a year ago, those that are able to do so will continue to invest new capital wherever it is believed the investment will help to reduce operating expenses. Only great reductions in operating expenses have enabled the roads to withstand the adverse influences to which they have been subjected for years, and especially in 1930. Their total earnings have been showing a tendency to decline even in good years, those of the Class I roads having been $10,000,000 less in 1929 than in 1923 and about $100,000,000 less than in 1926. In 1930 total earnings were about $970,000,000 less than in 1929; about $980,000,000 less than in 1923, and about $1,070,000,000 less than in 1926. Their operating expenses in 1929 were $389,000,000 less than in 1923, and $163,000,000 less than in 1926. Their operating expenses in 1930 were about $525,000,000 less than in 1929, about $690,000,000 less than in 1926, and about $915,000,000 less than in 1923. There has been nothing fortuitous about their ability to effect such huge reductions. Those made in 1930 were largely the result of drastic retrenchments in maintenance; but the general tendency of operating expenses has been downward throughout the last decade, and the large investment made in permanent improvements has been the principal reason for this. Without the economies made in both good and poor years they never could have stood the increases in wages and taxes, losses of passenger business and reductions of rates that have occurred.

The continued investment of capital will be necessary to the continued effecting of economies. Unfortunately, the many railways that have earned little or nothing in excess of their fixed charges recently will encounter difficulty in finding the means with which to make even investments which their managements know would effect economies.

Another Record Year in Roadway Improvement

Last year was one of marked contrasts in construction and in maintenance of way activities. From a construction standpoint, 1930 was a year of unusual activity, the expenditures for roadway purposes for the first nine months of the year exceeding those of the same period of 1929 by $63,000,000. These expenditures were in fact greater than in any year since the war, although the closing months of 1930 saw some slackening, as one project after another was completed.

The mileage of new lines completed was smaller than in any year since 1924. There is, however, a large mileage now under construction, and a still larger mileage authorized by the Interstate Commerce Commission on which grading has not yet been started. The outlook is, therefore, for a continuation of new line construction on a scale at least equal to that which prevailed during the last two years. As in the recent past, the construction of multiple main tracks was at a low ebb, largely as a result of the more extended installation of signaling facilities to promote the more intensive utilization of tracks now in service. In the main, the roadway expenditures were devoted more largely than ever before to that wide variety of projects which contribute directly to reduced costs of operation and of maintenance.

While the roads continued during the early months of the year to maintain their properties on practically

the same scale as in 1929, they reduced maintenance expenditures with increasing severity as the year progressed, with the result that total maintenance of way expenditures for the year were about $140,000,000 less than those for 1929. Even after this retrenchment, however, the properties enter the new year in excellent shape, both by reason of the seven years of progressive and continuous upbuilding of the roadway and structures that preceded 1930, and by reason of the economies that are now being realized from the investments made in these earlier years for treated ties, tie plates, labor saving machinery, etc. Also, the deterioration of the tracks and structures was reduced last year by reason of the subnormal rainfall. The decline in traffic also reduced the wear and tear.

Signaling Progress in 1930

The volume of signaling installations completed during 1930 was about nine per cent in excess of the previous year and considerably above that for 1927, the previous peak year in terms of miles of road equipped with automatic block. As a matter of fact, the miles of road signaled in 1930 was 20 per cent less than in 1929 and 28 per cent less than in 1927. However, the increased popularity of remote power-operated switches with centralized control for directing train movements has been an important factor in maintaining the total volume of expenditures in the signal field. Likewise, interlocking programs exceeded those of the previous year, as did also the installation of automatic highway crossing signals.

Because of changed conditions, the mileage of line equipped with new signaling can no longer be used as the most important gage of activity in the signaling field. Although there are thousands of miles of important lines yet to be signaled, nevertheless a greater volume of apparatus is being installed on lines which have been signaled for years. These improvements include not only the replacement of old automatic signals, but also cab signaling, train control, new interlockings, remote and centralized control systems and car retarders. Recognizing these changed conditions, a new unit has been devised for calculating the total volume of business in the signal field, as explained in detail in an article elsewhere in this issue. On this basis, installations including 18,928 units were completed in 1930, as compared with 17,118 in 1929 and 14,718 in 1927, the previous peak year.

The reason for expecting signaling construction to continue in large volume is that the benefits produced include not only the reduction of train delays, but, perhaps of more importance at this time, the direct saving in operating expenses due to reduction in the number of employees, which is particularly true with reference to centralized control and car retarder installations.

Mechanical Department Developments

One of the most noticeable developments of 1930 as regards mechanical department operation was the curtailment of locomotive and car maintenance programs. In spite of the best efforts of railway executives, many of whom have shown an increasing appreciation of the value of stabilized operation in the mechanical department, shop forces were generally cut to the bone, the number of working hours per week reduced, and in many cases repair shops closed. There can be no doubt that this drastic cutting of equipment maintenance has resulted in a certain amount of deferred maintenance, which constitutes one of the problems confronting the railroads in the new year. Early improvement in this condition is indicated by the news that early in December six roads in the east and middle west opened shops and increased forces by the re-employment of slightly over 15,000 men.

In the field of locomotive design, experiments with high pressures continued, as well as with the use of alloy steel in the boiler shell and other parts to keep within weight limitations. Emphasis in practically all of the designs was also placed on higher speeds and greater sustained power. An increasing proportion of the new locomotives was designed with integral cylinders and bed frames, and the experiment was also tried of casting the main reservoirs integral with the frame. Roller bearing tests were continued, and for the most part successfully, for use on engine trucks and tender trucks. The outstanding achievement of the year in connection with roller bearings, however, was their application to the main driving and trailer journals as well as to the engine truck, of a heavy modern locomotive which showed promising results in several months of test service. Additional applications of roller bearings were also made to passenger train equipment and, to a limited extent, for test purposes, to equipment in freight service.

In the field of car construction, the tendency toward heavier equipment of all types predominated. One of the unusually interesting designs of the year was that of a tank car in which the underframe and bottom course of the tank were made in a single steel casting. Experiments with mechanically-cooled refrigerator cars were continued, and 1930 also recorded the development of the first practicable mechanical air-cooling and conditioning equipment for application to passenger cars.

An important study conducted by the American Railway Association, Mechanical Division during the past year was the investigation of automatic train line connectors, arrangements having been made to conduct laboratory tests of such devices at Purdue university, as well as road tests subsequently. Other important work of the Mechanical division included the joint investigation of tank car appliances and devices made with the co-operation of the American Petroleum Institute and the American Car Institute.

Twelve months' experience with the working of the A. R. A. Interchange Rule 66 (which makes a car owner responsible for the cost of periodic repacking of journal boxes) indicated that it has a marked tendency

to improve railway operation by reducing hot boxes and decreasing car maintenance costs.

Condition of Railway Credit

The question as to the effect that will be produced upon railroad credit by the large decline of net operating income in 1930, and the far from encouraging prospects of 1931, is of great importance. Stock market prices are, of course, determined by mob psychology as well as by actual and prospective economic changes. The changes in prices of railway stocks that have occurred during the depression are, however, by no means without significance.

The *Railway Age* publishes each week the average price of twenty representative railway common stocks. This average on July 30, 1923, following two bad years and the shop employees strike, and a short time after the railways announced their now famous program for improving their properties and service, was $57.80. It increased pretty steadily from that time on until early in 1929, when, following the decision of the Supreme court in the O'Fallon case, it climbed rapidly from $127.48 in April to $164 in September. On December 24, because of the collapse of the stock market, it had declined to $127. It increased in the early part of 1930, but then began to decline again and on December 9 was down to $85, or only two-thirds of what it was a year previously, soon after the collapse of the market. It is an encouraging fact that this average price was substantially higher than that of July, 1923, when the general advance of stock market prices began, but meantime most of the railways whose stocks were included in the average had increased their dividends. The prices of all dividend paying railway common stocks became so low in December, 1930, that the average yield upon them was almost 9 per cent. The facts given indicate the extent to which the public had lost confidence in railway stocks.

Meantime, the standing of many railway bonds was being threatened because of the danger that they would fail to earn one and one-half times their fixed charges, and thereby make their bonds ineligible as investments for savings banks in New York and perhaps other states. How many railway bonds have lost their standing as savings banks investments will be known only when complete statistics of earnings for 1930 are available. Another year of such earnings would do damage to the credit of many railways that could not be repaired for many years; but it seems reasonable to hope that the worst is passed and that their earnings will show gradual improvement in future.

Railroad Conditions in Other Countries

It will be interesting to our readers in North America to learn that railways throughout the world have been affected by influences similar to those by which the railways of this continent have been affected. There appears elsewhere in this issue an article reviewing railway conditions and developments in foreign countries. "Poland," our correspondent in that country says, "was affected by the economic crisis of the world and therefore the railways * * * had to cope with the results of this crisis." He adds: "The very increasing use of automobiles has, during recent years, deprived the railroads of much income. The arrangement of proper collaboration between these two means of transportation will have to be solved by the government in the near future. * * * The government proposes to establish a system of licenses and to put a tax on operators for the upkeep of highways." In Czechoslovakia "under the pressure of the economic slump and of highway competition it is expected that net operating revenue will decline, and it was necessary to raise passenger rates by 20 per cent as of January 1, 1931."

"During the year 1930," says our Japanese correspondent, "the general business depression has had a very unfavorable effect upon the earnings of the Japanese railways. * * * Freight traffic has been more seriously affected by the depression than passenger traffic," and highway routes are now being established in lieu of extending rail lines to new areas.

"The world-wide industrial depression has left its mark on the British railways," writes W. H. Fraser. As to highway competition, "By the middle of the year an agreement had been reached with practically every important motor coach operator in railway territory. * * * Highway freight operations, including collection and delivery and country lorry and general services, were extended to cover the entire country, while unremunerative branch lines and stations were closed and highway services substituted."

World-Wide Study of Competition

Both the International Railway Congress, at its meeting at Madrid, Spain, last spring, and the International Chamber of Commerce, at its meeting in Paris in November, took cognizance of the competition between carriers by rail and highway almost throughout the world, and adopted resolutions regarding it. The resolutions of the Rail Transport Committee of the International Chamber of Commerce provided for an inquiry, "(1) to determine the effects of the development of motor traffic upon railroad traffic in its various classes and particularly in those classes of goods that are most affected, and (2) to arrive at a comparison between the amounts appropriated for the highway system as a whole, its upkeep, its development and administration with the amounts appropriated for all other transport systems together and to determine the additional expenditures caused by motor traffic." It was decided to create a sub-committee to make these inquiries.

It was also recommended that there be held a joint conference of the members of the Rail Transport Committee and of the Highway Transport Committee of the International Chamber "to inquire in particular into what administrative measures should be taken with a view to insuring the co-ordination of the two means of transportation in the interest of general economic welfare."

Railway Executives Expect Gradual Improvement of Business

Give information and views regarding unfair competition of other means of transportation and remedies that should be adopted—Probable capital expenditures

GRADUAL improvement in general business and railway freight traffic in 1931 is expected by railway executives, as shown by replies made by them to a questionnaire sent out by the *Railway Age* and published herewith. Most of them believe that freight business will show no large improvement in the first half of the year, but will substantially increase in the second half of the year, and during the entire year will be at least as great as, and probably greater than, in 1930. They express no optimism regarding passenger business, but some of them believe the reduction in 1930 was due as much to the depression as to the competition of other means of transportation, and that consequently some increase in passenger business may be expected as the depression passes.

Retrenchments Cannot Long Continue

They expect capital expenditures to be substantially smaller this year than last. They do not believe that the large reductions in maintenance expenditures made during the last year have, as yet, done most railway properties any harm, but make clear it is their opinion that such retrenchments could not be long continued without serious deterioration of properties and service.

They discuss the competition of other means of transportation at considerable length and are virtually unanimous in expressing the belief that the competition to which the railways are being subjected is unfair, and that new governmental policies, including charging motor coaches and trucks more for the use of the highways, and increased regulation of other means of transportation, are needed in justice to the railways and to make competition with them and other means of transportation equal and fair. In the following material is given the questions submitted to the railway executives and the answers made by each of them.

Prospects of Business in 1931

No. 1.—What are the prospects for railway passenger and freight traffic in your territory in 1931?

F. E. Williamson, president, Chicago, Burlington & Quincy.—It is impossible to view the railroad situation and prospects as optimistically as a year ago or in the early part of this year, when we were having what was thought to be merely a temporary lull in business. The depression has existed for so long, that the greatest encouragement is that we are nearer the turning point. We feel that the bottom has been reached in freight traffic during 1930 and there should be some improvement in 1931. However, there has been practically no recovery in commodity prices nor marked increase in employment to date, and these conditions will probably have to change before we see general business improvement. We do not expect any improvement in passenger traffic, inasmuch as there has been a constant decrease since the peak in 1920, which averaged around 10 per cent each year below the previous year, until 1930, when the decrease was accentuated by business and abnormal conditions and was more than 20 per cent below 1929. We have a gross revenue from passenger traffic of somewhat over 15 million dollars in 1930, as against over 36 million dollars in 1920. Owing to the abnormal rate of decrease in 1930 it may be that 1931 will show a gain or hold level with 1930, but we feel a natural doubt about this in view of the uninterrupted decline for ten years.

L. A. Downs, president, Illinois Central.—Passenger and freight traffic in our territory in 1931 will be governed by conditions which are extremely difficult to forecast at the time this is written. Railway traffic has been seriously affected for more than a year both by the general curtailment of business activity and by the intensified competition of other forms of transportation. The unstable business situation has made it hard to determine where the bulk of the blame for the traffic loss belongs. If competition has caused most of it, and no improvement is made in competitive conditions, the railway decline will no doubt outlast 1931.

Quick Action to Meet Competition

On the other hand, I look for a definite improvement in the general business situation in 1931. That view is supported mainly by the important fact that production in most lines has so long been running behind consumption that demand has piled up to the point where production must be increased to meet it. As demand begets production, so production begets distribution, and that of course involves transportation. Barring further competitive losses, I feel that this phase of the situation is distinctly favorable to the railroads as they enter the new year.

The outcome in 1931 depends largely upon what progress can be made in a relatively short time to eliminate the inequalities of competition which have so greatly handicapped the railroads. If I appraise public sentiment correctly, we shall see in 1931 an overwhelming demand to put the railroads on a basis of equality with their competitors. Action thereunder depends upon the success of the railroads in getting the united support of business men, farmers, taxpayers, railway employees and other groups adversely affected by the present situation.

J. M. Kurn, president, St. Louis-San Francisco.—I will be greatly disappointed if 1931 is not a decided improvement over 1930.

Fred W. Sargent, president, Chicago & North Western.—In my opinion 1931 will show, as a whole, a

marked improvement over 1930 in general business prosperity. There is no doubt that for some years we experienced unusual prosperity on account of increased production due to catching up with the wartime shortage. When the break came, it affected a few industries only, but as these were affected and began to curtail, the depression spread to other industries until it became generally felt throughout the entire country. All indications now point to the conclusion that the unbalanced conditions arising out of commodity decline in prices are rapidly adjusting themselves; consumption is catching up with production and public confidence is once more being restored. With these factors present, it seems to me quite clear that 1931 will show an improvement over 1930, although I do not look for any marked change for the better until the latter half of the year.

Need Better Prices for Farm Products

In the west we need better commodity prices for our farmers, and along with this reasonable assurance of a normal crop next season. As industry begins to pick up and employment is restored, we will, in my opinion, see improvement in commodity prices for farm products. There is only one thing that stands in the way, and that is the abnormal surplus that is being carried over to threaten future markets by the Federal Farm Board. The board, however, is exercising every possible effort to avoid this condition, and I have faith to believe that under its present management it will see the wisdom of getting rid of this surplus, even at a loss if necessary, rather than to hold it as a threat over next year's crop. The entire agricultural region, if once made prosperous, would afford markets of great quantity for manufactured products. Our farmers have not been buying and improving their properties because of the long period of depression through which they have passed, now culminating in commodity prices which are about the lowest since 1902.

Without going into an analysis in detail, it is sufficient to say that indications are that we may look for better prices in the near future, and with this a return of confidence to our farmers throughout the great middle-western part of our country. With this return of confidence and better farm income, we may expect a return of normal business conditions throughout this western section of the country at least by the latter half of next year.

J. M. Davis, president, Delaware, Lackawanna & Western.—Business on this railroad for the first six months of any year depends largely upon weather conditions. If we have a cold winter, we shall have a heavy movement of anthracite coal. Should we experience a mild winter—similar to those of the past three years, business will not be so good, of course. We do not look for a marked increase in the movement of general merchandise, but we do believe that there will be a noticeable upturn after the first quarter.

A. E. Clift, president, Central of Georgia.—The prospects are that our total freight traffic for 1931 will be about the same as for 1930—a decrease of approximately 14 per cent from 1929. We anticipate a decrease during the first six months of 1931 compared with a like period of 1930, but believe that this will be offset by an increased movement during the latter half of the year. We are not hopeful of any improvement in passenger travel for the first half of 1931, but expect that on account of improved business conditions for the latter half of the year we may look for a greater volume of travel during that period. It is problematical, however, as to whether the railroads will be successful in attracting any considerable part of the increased total traffic.

M. H. Cahill, president, Missouri-Kansas-Texas.—While conditions in the southwest may not warrant expectation that business generally in 1931 will reach the volume of 1929, ample reasons are presented for anticipating improvement over 1930. The southwest is free from adverse local conditions, other than those directly traceable to low prices of several principal income commodities, and will respond quickly to a more optimistic business outlook in the country as a whole. Whether the renewed business activity anticipated in the southwest, as the year advances, will be reflected fully in railroad revenues, is unfortunately, an entirely different matter.

J. J. Pelley, president, New York, New Haven and Hartford.—We expect some improvement in freight traffic in our territory in 1931, particularly during the latter part of the year, because it is anticipated that 1931 will be a year of slow but gradual recovery from the present depression. Passenger traffic has been declining since 1920 and in 1930 was further decreased by the depression. With an improvement in business, we expect passenger traffic in 1931 to hold its own, and possibly increase.

Western Patrons Need More Buying Power

Carl R. Gray, president, Union Pacific.—To be candid, I must say that I do not know how railway passenger and freight traffic in our territory in 1931 will compare with the year just closing. People in the west are essentially producers. When they can sell, and at a good price, they are heavy buyers, and their buying ordinarily results in westbound traffic. As the eastbound freight movement heavily predominates, any additional westbound movement is practically that much increase in net earning. Our difficulty revolves around buying capacity, and this can only result when we have a higher price level, and a heavier demand for products of the soil, forest, and mine.

Speaking for our individual property, it is fair to say that we have for movement on December 1 a larger surplus of agricultural products than normally; in other words, we have the potentialities for a good business, but without the demand. And so our progress will depend to a large degree upon recovery in the central and eastern districts. The condition is interdependent, and for this reason I cannot foresee an improvement which would affect one section of the country and not all others. The betterment, when it comes, will affect the whole country alike.

I do not look for a marked comeback at any particular time. Materials are being depleted and stocks greatly reduced, money is plentiful and cheap, and I am hopeful that at least with the spring an improvement will set in and we will gradually get back to a higher level. I realize this is not very helpful, but a great many who were quite optimistic last fall have had to entirely readjust their viewpoints, and all of us now realize that the depression is more serious and its effects more lasting than anticipated.

Gradual Improvement Foreseen

A. C. Needles, president, Norfolk & Western.—We do not foresee a strong revival of business in the immediate future, but believe there is good ground for anticipating gradual improvement, which we feel should assume some proportions in the spring of 1931 and result in a fair average volume of business for that year. There seems little question but that stocks in all lines are very much depleted so that any sustained demand would necessarily involve increased production, which would be beneficial all along the line.

W. B. Storey, president, Atchison, Topeka & Santa

Fe.—The territory served by the Santa Fe has experienced the same vicissitudes that have befallen our country generally this year. The drought in the summer curtailed its crops, but much less than in territory further east. Wheat was made before the drought and turned out well, cotton fair, corn from 25 per cent to 50 per cent off, and other crops fair; but with the low prices the monetary return has been greatly reduced. Only citrus fruits brought good prices and with rather small crops produced an excellent return. Oil, mining, lumber, building, manufacturing, and industry generally have been depressed, and our traffic has suffered accordingly. Roughly it has run about 13.5 per cent behind last year, which it should be remembered was the greatest in our history, but only 6 per cent behind 1928.

Good Outlook for Citrus Fruits

In looking forward we find that winter wheat has had favorable conditions up to the present time and citrus fruit gives promise of a much heavier crop than this past year. It should be remembered, however, that it is still too early to make any definite forecast as to either of these crops. Commodity prices seem fairly well stabilized and any strengthening of them will be a favorable sign. We feel that the coming year will bring improved business conditions, but that the recovery will be slow. We hope, however, that a year from now we can all record substantial improvement and a bright outlook.

W. L. Ross, president, New York, Chicago & St. Louis.—I look for a slight improvement in traffic volume and earnings in 1931 compared with 1930, with a somewhat more substantial gain in the closing quarter. The results for the year, however, will fall far short of 1929.

C. T. Jaffray, president, Minneapolis, St. Paul & Sault Ste. Marie.—I see no prospect of any increase in passenger travel during 1931, chiefly because of the increasing competition from buses, the constant addition to hard surface roads throughout our state and territory, and of course the natural decline through business depression. Freight traffic for the first six months of the year will probably be somewhat less than last year. However, this will be affected somewhat by the question of ore tonnage which comes to us early in May. If this tonnage is good, the loss in business may be only nominal. As our largest amount of traffic comes in the fall and is dependent upon the outcome of our crops, it is difficult to predict what will happen at that time.

1931 May Be Better Than 1930

R. B. White, president, Central Railroad Company of New Jersey.—The immediate outlook for increased passenger and freight traffic, in the territory served by the New Jersey Central, is not discouraging. Just as soon as industrial and economic conditions improve throughout the country, our situation will similarly show improvement. As to when the upturn may appear, it is my judgment that a recovery may not be looked for until towards spring of 1931, and that it will continue moderately, resulting in the 12 months being equal to, if not indeed ahead of, 1930.

J. E. Gorman, president, Chicago, Rock Island & Pacific.—The passenger traffic situation does not warrant optimistic predictions for 1931 because of the continued drawing away from railroads by private automobiles, motor buses, and aeroplanes. During the year there was a large falling off in passenger train travel on all western railroads, and it is the opinion that passenger train travel in 1931 will not be any better than in 1930, and perhaps slightly lower.

With regard to freight traffic: Presently the prospects for an increased volume of freight traffic in the western and southwestern territories are not encouraging. A substantial reduction in rates on grain and grain products has been ordered to become effective April 1, 1931, and the revenue accruing from this class of traffic will decrease considerably by reason of the lower rate. The railroad's traffic is being drawn away by competition of unregulated trucks, pipe lines, and inland waterways, and there is no new traffic in sight to produce offsetting revenues. However, the traffic in this territory is much dependent upon crop conditions and output, and based upon an average crop yielding a fair price, together with replenishment of stocks by industries, it is hoped that there will be an increase in the volume of traffic, especially after the first quarter of the year.

Paul Shoup, president, Southern Pacific.—We cannot at this time make any satisfactory forecast of either freight or passenger earnings for 1931. Our canvass of shipping interests along our lines gives us hope that the revenues will at least equal those of 1930, but obviously they will be responsive to the trend of general business, and that as yet on the Pacific coast is uncertain, though our people generally are quite hopeful. The substantial decrease in our passenger revenues in 1930 we hope will be followed in 1931 by revenue at least equal to that of 1930. Again this is not based on anything tangible, and business conditions generally will be the controlling factor.

Improvement in Spring

Ralph Budd, president, Great Northern.—No one can predict with any degree of confidence what the 1931 traffic will be, but my opinion is that freight traffic on the Great Northern will be somewhat more than in 1930, while passenger traffic will decline, due to the increased travel by automobile.

I think general conditions will show improvement next spring, and as soon as normal consumption is resumed, factories will become active, as undoubtedly the stocks of merchandise are generally depleted.

J. J. Bernet, president, Chesapeake & Ohio.—We look for some improvement in business conditions by the middle of 1931 and a slow but steady recovery toward the end of the year. Gross earnings in 1931 will probably show an increase over 1930.

J. S. Pyeatt, president, Denver & Rio Grande Western.—From our view there is not a remote indication that the volume of railway traffic in our territory will be as heavy in the first half of 1931 as in the same period in 1930; on the contrary there is strong evidence it will be less. It is difficult to predict now the measure of freight traffic that will be available during the second period. That will depend entirely upon the trend of general business throughout the country which at this time is totally indefinite. With a good crop yield and fair market conditions there should be a slight improvement, but I think it will be very gradual.

E. E. Loomis, president, Lehigh Valley.—The situation confronting the railroad industry at the close of a most unsatisfactory year is surrounded by so many uncertain conditions that it is difficult to predict what may develop during 1931.

Public Understanding Needed

Recent action on the part of the railroads themselves as to future policy, which was followed by some most constructive recommendations by the Interstate Commerce Commission, in its report to Congress, promise to put the problems of the industry clearly before the public and a better understanding of them must surely follow. If legislators and the traveling and shipping public will

co-operate in support of the recommendations of the carriers and the commission, the results are bound to inure to the benefit of all those interested.

Just at this time what is needed more than anything else, however, is increased traffic and until there is a definite upturn in the general business of the country, the carriers stand to suffer proportionately more than other lines of industry.

The creation and further development of subsidized transportation competitors, when there are already available ample facilities to handle the present demand of modern-day business requiring such service is most unwise. It is a fallacy to believe that the way to cheapen transportation is to increase the number of competing agencies through large expenditures by government authorities. The waste, by duplication, is a problem which concerns every citizen because it adds to the national transport costs, which the public must pay in some form. The only constructive way to cheapen transportation is to increase the volume of traffic which can be handled by the great mass producer—the railroads—and effectively control their subsidized and unregulated competitors.

H. A. Scandrett, president, Chicago, Milwaukee, St. Paul & Pacific.—Our traffic during the past month or six weeks has been running at the low of the year. We do not expect revenues for the first six months of 1931 to equal those of the corresponding months of 1930. While, under present conditions, it is extremely difficult to forecast when the improvement that is bound to come will take place, it is my view that there will be some improvement in the spring of next year, and the last six months of 1931 will show some improvement over the corresponding period of 1930. I expect there will be a gain for the year, although not a very large one. The decline in passenger business has been so severe, and the revenues have now reached such a low point, that it seems hardly possible there can be much further falling off in this class of traffic.

Probable Capital Expenditures

No. 2.—How will the capital expenditures of the railways for 1931 probably compare with those for 1930 and other recent years?

W. B. Storey, president, Atchison, Topeka & Santa Fe.—The Santa Fe is engaged in building 350 miles of new lines in Texas, Oklahoma, Colorado and New Mexico, on which we shall do some 5 million dollars of work this coming year. We have ordered over 6 million dollars of new equipment, our addition and betterment program will be about normal, requiring from 20 to 25 million dollars of expenditures, and our maintenance of way and structures and of equipment will be about normal.

W. L. Ross, president, New York, Chicago & St. Louis.—Nothing I could say in detail would be of a definite character.

We have many things to do on our railroad; there are many projects under consideration. We have many items, such as bridge construction, double track work and separation of grades before us, and our program for the next year in this case will depend entirely on the business situation and business conditions.

Of course, I can only say, with our service as it is now, we have facilities for doing double the business we are doing. Our capital expenditures for the past few years have been substantial and while we have, as I said before, many improvements under consideration, the business conditions do not justify the continued capital expenditures for increasing facilities at this time. Our program for maintenance will be continued and carried on through the year as usual, and our property will be maintained 100 per cent.

Capital Expenditures Depend on Business

J. M. Kurn, president, St. Louis-San Francisco.—Capital expenditures for 1931 as compared with 1930 is simply a question as to how 1931 as an earning year will hold up as against its predecessors.

L. A. Downs, president, Illinois Central.—Continued capital expenditures by the railroads in 1931 must depend upon a material improvement in the financial position with which they end 1930. Capital expenditures in 1930 substantially exceeded the amounts justified by current earning power. That situation cannot be indefinitely continued.

M. H. Cahill, president, Missouri-Kansas-Texas.—Existing conditions undoubtedly will be reflected in capital expenditures for 1931, for the reason that the railroads are now equipped to handle a larger traffic volume than is in immediate prospect. Improvement programs, comparing with those years preceding 1930, are therefore hardly to be anticipated.

C. T. Jaffray, president, Minneapolis, St. Paul & Sault Ste. Marie.—So far as the Soo road is concerned, the capital expenditures for 1931 must of necessity be less than those of 1930 chiefly because we haven't the money and to borrow it at the present time is out of the question.

Ralph Budd, president, Great Northern.—The capital expenditures on the Great Northern in 1931 will be a little less than in 1930.

The Great Northern has spent over $100,000,000 for improvements in the past seven years, and in addition to the improvements on the operated line, an extension was built from Bend to Klamath Falls, and construction is now under way from Klamath Falls south to a connection with the Western Pacific in California.

J. J. Bernet, president, Chesapeake & Ohio.—Indications are that capital expenditures in 1931 will be less than in 1930.

E. E. Loomis, president, Lehigh Valley.—So far as the Lehigh Valley is concerned, the expansion program followed since the end of federal control has brought the property to a high degree of efficiency. What may be expended in the way of additions or betterments during the coming year will, naturally, depend upon the amount of business offered. The road holds a strategic position in the industry.

New Haven Expenditures to Equal 1930's

J. S. Pyeatt, president, Denver & Rio Grande Western.—The extent of capital expenditures during 1931 will necessarily be governed by the earnings and credit of the railroads. Unless there is material improvement in the trend of both during the first part of the year I predict that such expenditures will be relatively small compared with 1930.

J. J. Pelley, president, New York, New Haven & Hartford.—The New Haven expects that its capital expenditures for 1931 will be about the same as for 1930. However, with an improvement in business, they may possibly be greater. Expenditures in years prior to 1930 largely reflect the rehabilitation program, and a comparison of 1930 or 1931 capital expenditures with the earlier years is not significant.

Carl R. Gray, president, Union Pacific.—It is too early to say about capital expenditures in 1931. I do not believe they will be as heavy as in 1930, which was

among the record years, but they should compare favorably with the average of the post-war years.

A. C. Needles, president, Norfolk & Western.—Railway capital expenditures during 1931 will be considerably less than those for 1930, and largely dependent upon the revival of business.

J. M. Davis, president, Delaware, Lackawanna & Western.—Lackawanna expenditures for capital account during 1931 will fall considerably under those for 1930, which were unusually large because holding to the letter of our promise to the president of the United States, we continued our construction program with the Jersey City terminal warehouse and freight station lay-out and our northern New Jersey suburban electrification project, just as though business conditions were normal—completing the former and all but completing the latter. If business promises substantial improvement in the spring, we now anticipate being in the market for some locomotives, freight cars and shop equipment.

A. E. Clift, president, Central of Georgia.—Unless business conditions improve more rapidly and more completely than the present outlook indicates, we believe that capital expenditures of the railways for 1931 will be considerably less than for 1930 and other recent years.

J. E. Gorman, president, Chicago, Rock Island & Pacific.—During the year 1930, as well as each preceding year, since the termination of federal control, the railroads have expended vast sums of money for new and improved locomotives, freight cars, passenger cars, extension of lines, heavier weight rail, ties, ballast and other improved facilities, in order to condition themselves to handle a peak volume of traffic. The expenditures in 1930 were enormous and were made in anticipation of handling a peak volume of traffic, which, as we know, did not materialize, but rather was far below normal, and it is felt that on this account the railroads' present facilities are more than sufficient to handle the traffic that may be handled in 1931. Therefore, additional facilities will not be required to the extent that they have been in recent years.

Roads Should Pay More to Owners

F. E. Williamson, president, Chicago, Burlington & Quincy.—Capital expenditures of our lines in 1930 will exceed 1929, and this is the situation of railways of the country as a whole, at least for the first nine months this year, as compared with the same period last year. This work was largely planned before the extent of the decrease in railroad revenues was known. Apparently, inevitable curtailment will take place next year, although railroad capital expenditures are relatively very constant. The decrease we have suffered in net revenues and the imperative necessity that railroad security issues be not weakened by further recession in the margin earned on bonds or reduction in dividends will leave considerably less of the surplus earnings to be put back into property. Economists generally concede that railroads should pay a larger proportion of their net earnings to the owners, whereas the policy of well managed properties has been to put 30 to 50 per cent of the earnings back into the property, even though such retrenchment has produced in most cases little, if any, return, and the theory of protection of railroad investments afforded by the Transportation act, 1920, has never worked out in practice.

H. A. Scandrett, president, Chicago, Milwaukee, St. Paul & Pacific.—In the case of this company, our capital expenditures for the first nine months of 1930 were some $5,000,000 in excess of the largest similar expenditure made in the corresponding period of the past five years. While we have not yet determined the budget for 1931, it will undoubtedly be substantially less than it was in 1930.

Competition of Motor Coaches and Trucks

No. 3.—Highway Competition—

(a) Is motor coach competition becoming more serious and would a reduction of passenger fares for travel in day coaches be desirable as a means of attracting passengers now moving by highway?

(b) Please give information regarding freight traffic being taken by motor trucks, with such important illustrations of the effects being produced by them upon railway traffic as you may have available.

Carl R. Gray, president, Union Pacific.—Highway competition is a problem by itself. In the west, at least, the motor bus had taken much less of our passenger business than has the privately owned automobile, and, so far, reductions in passenger fares have not affected this latter item in the least.

The motor truck business is in a transition stage, and the distance which freight can be trucked on the highways at a profit has not been determined. The regular carriers could be licensed and regulated, but any legislation yet proposed would not reach the so-called "contract" or "chartered" trucks which in our territory greatly overshadow the regular trucks both in number and in tonnage hauled.

Lower Rates Bring Business

J. M. Davis, president, Delaware, Lackawanna & Western.—A reduction of passenger fares to two and one-half cents per mile, tickets good in coaches only, promises to put back on the rails considerable business which left them and now moves by bus, mainly because of the lower fares, of course. One concrete example: There is a rather heavy week-end traffic between Scranton and New York City. The buses cut into this heavily. About a year and a half ago we put in a round trip special excursion fare, tickets good in coaches only, from Scranton to New York city, which met the bus rate. This proved to be a good move for the railroad and the arrangement continues in effect.

Trucks have taken much of our business within a radius of 40 or 50 miles of all important centers. In an increasing number of cases they are securing a return haul. On all of this business the railroad loses the haul, of course—both ways.

Unreliable Service by Trucks

Recently, I saw a circular letter issued to the trade by a firm of brokers, stating that jobbers had been approached by truck operators who offered to haul their commodity from the factory at approximately the same rate as charged by the railroads; directed attention to the fact that the record of truck shipments during the previous week showed that two truck loads had been stolen and that another truck had run into a house, and suggested that as the railroads were established industries in their locality it seemed unfair to take business away from them; that when a railroad accepted a shipment the shipper knew that if the shipment was not delivered it would be paid for, whereas, if anything happened in transit to a shipment moving by truck the shipper was forced to assume the responsibility of receiving payment from the owner and that, as the majority of truck

operators serving them had purchased their trucks on the installment plan, that demonstrated the limit of their responsibility.

J. E. Gorman, president, Chicago, Rock Island & Pacific.—Motor coach competition, because unregulated by state or interstate commissions, continues to make further inroads on railroad passenger train revenue. Various railroads are now experimenting by making low coach rates to meet motor competition, but it is problematical as to whether or not sufficient additional traffic can be induced by the lower rate to offset the losses sustained in revenue by the reduction in fares.

Fairer Public Policy Needed

Unquestionably, motor trucks, many of them operating without a certificate of public convenience and necessity, are now handling considerable traffic, especially short haul merchandise, live stock, and automobiles, formerly handled by the railroads. It is the opinion that considerable of the traffic lost by the railroads would be recovered if transportation of traffic by trucks were properly regulated by state and Interstate Commerce Commissions, if such transport companies were compelled to pay a fair tax for use of highways, streets, building bridges, etc., and if fair regulations regarding such transport companies' liabilities as common carriers were enacted and enforced.

Recent activities of the Interstate Commerce Commission in connection with this subject, as well as views expressed by the President in his recent message to Congress, indicate that something may be accomplished in this direction, and it is hoped that proper regulation of such transport companies will soon be forthcoming.

C. T. Jaffray, president, Minneapolis, St. Paul & Sault Ste. Marie.—Competition from motor coaches on the highways is increasing and will increase as our hard surface roads are built, but the most serious situation we are up against is the privately-owned automobile and in this we can expect no change. I do not believe that a small decrease in passenger fares would make much difference, especially in the short haul business and I am rather inclined to think that in this territory it would further decrease our revenues.

We are feeling the competition of motor trucks very severely in the movement of livestock to consuming centers, in the handling of automobiles, also in the handling of dairy products from producing points to central points and from central points to consuming centers. These three items are constantly increasing and are seriously affecting our business. The handling of general merchandise by trucks in our territory is also increasing with not so great a loss to us as the previously mentioned products.

J. J. Pelley, president, New York, New Haven & Hartford.—While there is some increase in motor coach competition, the most serious phase of that competition, barring further developments, seems to have been passed. Because of the wide discrepancy existing between rail and motor coach rates, any reduction made in the former to return traffic to the rails would necessarily be so great that a decrease in total passenger revenue would probably result, even though rail traffic were stimulated somewhat by such action.

Bus Transport Stabilized on Pacific

Motor truck competition in southern New England is benefited by the large number of improved highways, the concentration of industries and the density of population. The amount of tonnage being handled by motor trucks in this territory is substantial.

Paul Shoup, president, Southern Pacific.—Motor coach competition is fairly well stabilized. Consolidations have resulted in a few large companies controlling the major part of the traffic on the Pacific coast. In the largest of these, the Southern Pacific company has a one-third interest. The field is now so well covered that there is not apt to be any expansion of consequence during the coming year. Competition as now exists is, therefore, not apt to increase in severity.

We have during the past two years, and in some instances for longer periods, experimented with reduced coach fares between centers of population, and these are in effect between the important cities on the Pacific coast. These are either all the time, or part time. Low round trip rates and low one-way rates have also been made when it was evident that traffic could be created thereby. Low round-trip rates have been made to eastern cities, and on occasion for relatively short periods, coach fares have been made effective. During the first six months of 1931, low rates for coach passengers, and a little higher rate for tourist car passengers will be effective between eastern cities of importance and the coast. This is the longest period during which coach rates have been made effective for long distances, aside from the rates in effect between cities entirely on our own line. We doubt the desirability of putting in coach fares generally, i. e., between points where there is little travel. Our experiments so far do not indicate that this would be helpful.

Gas Replacing Oil

Notwithstanding the increase in population and in industry, including the marked agricultural development on the Pacific coast, the less-than-carload rail traffic has been decreasing. Carload traffic increased between 1926 and 1929, inclusive, but the short haul record is unfavorable. The largest diversion in tonnage from the rail lines to the motor trucks has been in California, due to good roads, short hauls, favorable weather conditions, and close proximity to the consuming markets of the manufacturing centers; petroleum and petroleum products, principally gasoline, being handled very largely by motor truck equipment belonging to the owning oil companies, and also by large fleets of motor tank trucks that make contracts with these oil companies. Extensions of gas lines in California are taking a large part of the fuel oil business both from the railroads and trucks, and from the fuel oil pipe lines. Extensions of gas lines from El Paso westward will take a large part of the fuel oil traffic now moving from California and El Paso to the copper mines.

Unfavorable to Reduced Fares

Ralph Budd, president, Great Northern.—Highway competition in our territory remains about the same as it has been, and has not been a factor in our 1930 showing as compared with that of 1929.

Reductions in passenger rates have been tried rather extensively in our territory, and have always resulted in a loss. It has been found impossible to get enough additional passengers to make up for the reductions in fares, and such reductions only have a tendency to reduce both the gross and net earnings.

The motor truck competition is quite serious for less-than-carload and short haul shipments. A considerable amount of traffic is being handled by trucks between the Twin Cities and the head of the lakes, and also out of distributing centers, such as Fargo, Grand Forks, Minot, etc.

A. E. Clift, president, Central of Georgia.—Motor coach competition is rapidly becoming more serious, and it is our belief that a reduction in one-way fares for

day coach travel is desirable and would attract passengers now using automotive transportation for reasons of economy.

Freight traffic being taken by motor trucks from rail carriers in our territory largely consists of less-carload shipments for hauls up to distances of 150 miles, though there is much of it moving by motor trucks for greater distances, also cotton, which while moving largely on rail carriers in carload lots readily lends itself to motor truck transportation. The same is true of cottonseed, fertilizer and forest products. Important illustrations of effects being produced by motor truck competition on our railway are decreases in less-carload freight moving from station to station to the extent where local freight trains were operated daily. This loss in business has necessitated reductions in service to tri-weekly trains, and the closing of a number of agency stations because the business formerly done at these stations has been diverted from the rail carrier to motor trucks. Inroads made by motor trucks in the transportation of cotton, so far this season beginning August 1, 1930, is illustrated by the fact that while cotton ginned in Georgia, August 1 to November 14, 1930, increased 30 per cent over that ginned the same period in 1929, the movement of cotton to the Port of Savannah by motor truck for period August 1 to November 28, 1930, increased 138 per cent over the movement for the same period last year, whereas the movement of cotton by rail carriers to the Port of Savannah for the same period increased 29 per cent this year compared with last. This showing was made by motor trucks notwithstanding carriers reduced their normal rates on cotton this season to the rates charged by motor trucks for distances up to 150 miles.

In addition to the cotton traffic motor trucks are also making serious inroads on shipments of cottonseed from nearby country points to oil mill points, fertilizer from factories to country stations, and forest products consisting of logs to sawmills and lumber therefrom.

Contract Trucks a Danger

Recently several large manufacturers in official classification territory have contracted with motor trucks to haul outbound shipments of finished products to their southern branches and inbound shipments of raw material to be used in manufacture from southern producing points. Such movements have assumed rather large proportions and if adhered to and extended by manufacturers having movements in both directions will considerably curtail the railroads' long haul traffic.

F. E. Williamson, president, Chicago, Burlington & Quincy.—Motor coach competition has gradually become more serious, although it is the private automobile that has taken away most of the short haul passenger traffic. As a matter of fact, in 1930 our exceptionally large decrease in passenger revenues was principally due to general decline in travel, rather than an increased proportion of the business going to the highway lines. Coach rates are now being put into effect on some of the railroads for long distance travel on a scale to meet highway competition charges, with the thought of testing out whether sufficient business will be gained to increase total railroad passenger revenues—a point about which there is considerable difference of opinion. Attention should be drawn to the fact that the bus rates can be changed without governmental permission, so maintenance of exactly the same rates by rail and by highway is impossible.

Practically all kinds of traffic now move by motor truck. Their rates and service are wholly unregulated, and in addition to the established lines doing a common carrier business, though not accepting the responsibility that is enforced on the railroads, and the fleets of trucks operated by large shippers, the unemployment situation has probably increased movement of freight by truck. It is a business that can be started by an individual in a small way with a single leased truck. Coal is being trucked from a mine 52 miles from Chicago to suburban stations, and from nearby mines to St. Louis and from northern Colorado mines to Denver. Motor trucking formerly affected mostly the less-than-carload business of the railroads, but it is now taking away much carload business, particularly livestock. We have instances of extensive trucking of fruits and vegetables, butter and eggs, poultry, etc., and while the volume of this business taken away from the railroads may be relatively small, the loss comes largely out of net revenue.

Frisco to Try 2-Cent Fare

J. M. Kurn, president, St. Louis-San Francisco.—Motor competition is becoming more serious and the Frisco railroad now has before the Interstate Commerce Commission its concurrence in a plan of amending its passenger tariffs applying throughout its system, establishing a two cent passenger fare, good in coaches and chair cars only, with a limitation of 100 pounds of baggage for each passenger.

Freight traffic by truck is in our case, the same as with other railroads, resulting in a very substantial disappearance of so-called merchandise business for hauls 200 miles and under. On certain carload traffic also the truck has become a very consequential factor. I could mention many illustrations but the value thereof would but intensify the thought.

L. A. Downs, president, Illinois Central.—Highway competition has adversely affected the railroads over a wide territory, and the situation is growing constantly more serious. Every means of meeting that situation by internal methods deserves careful attention.

In respect to reduced rates for passenger service, our road has realized most from the operation of frequent reduced rate excursions. It is believed that new business has been created in that way, more than offsetting the loss of revenue from passengers who would otherwise travel at standard rates. General fare reductions have been tried over longer periods, but they have failed to prove that the amount of travel can be stimulated sufficiently by them to offset the loss of revenue per passenger.

Improved Railway Service an Aid

New inroads have been made by the operation of freight-carrying trucks on the public highways. It was formerly thought that the area of profitable truck operation would be confined to congested areas or short hauls between such areas. Recent experience has developed threats in operations over longer routes, notably in the trucking of automobiles, cotton, livestock and household goods. This competition can be met from an internal standpoint only by improved railway service or by reduced railway rates or by both. Results of present experiments will have an important bearing upon the answer.

Also of major importance in connection with the problem of highway competition is the effort now developing to remove the inequalities of competition between the railroads and highway carriers.

W. L. Ross, president, New York, Chicago & St. Louis.—There is no denying the loss of revenues to the railroads from the competition of motor coaches and motor trucks. The inroads of this competition have been accentuated by business conditions. Concerns that have experienced a serious drop in earnings have a

strong incentive to save a dollar in every way possible, including freight. This is true, too, of individuals with relation to personal transportation. Many persons have suffered a loss of all or part of income, and a dime to them looks as big now as a Turkish twenty-piaster piece. Consequently, if they must circulate around their adjoining and nearby communities, and they do not own automobiles, they turn to the motorbus as the cheapest form of conveyance.

Travel Volume at Low Ebb

But the passenger loss to the railroads does not end there. Travel generally, I believe, is at low ebb, and "pleasure travel" is relatively so small because of present circumstances as to figure hardly at all as a source of railroad income. Even those untold numbers of persons whose income is unimpaired or only slightly impaired are impelled to save every dollar possible by the fear of what might happen.

The passenger traffic which the motor coaches are taking away from the railroads is naturally causing us some concern. The real loss, however, is that resulting from the operation of private automobiles. I believe that this latter loss is estimated at 85 per cent, as against the 15 per cent ascribed to the competition of motor coaches.

The theory of a reduction in fare as a means of increasing railroad passenger traffic sounds all right, but I am not so sure that its application will materially improve the situation from the standpoint of the revenues derived from it. I think our main job is more nearly to equalize the conditions of the competition with motor coaches and motor trucks, driving home not only the present inequalities as the railroads see them but emphasizing also the transportation waste and what it is costing the public in two directions: (1) Public taxation for highway development and maintenance for which the motor coaches and motor trucks are not bearing their proper share, and (2) the burden on the public resulting from inadequate utilization of railroads, and the burden of railroad taxes which, in the last analysis, must be borne by those who pay the freights and the fares.

A Danger to Taxpayers

The average citizen is unaware of the significance and the inevitable consequences of those empty trains that he sees passing along the rights-of-way. He does not see them in the light of dwindling taxes the railroads will pay to the county and the state because of loss in earnings, and he fails to see that operating deficiencies must be made up in some way; that, finally, rates must be adjusted accordingly.

Any transportation company serving the public should pay in taxes what would be equivalent to the use of the roads. They should pay taxes in proportion to what the railroads pay, and they should be regulated as to the operation of their facilities, as to size, speed, liability, etc. It is important also that they be required to publish tariffs and adhere strictly to both interstate and intrastate rules, and there should be no discrimination as between a big or little shipper. That is what the railroads are up against. So far as railroads are concerned, laws are enforced that prohibit preferences or favors as an inducement to shippers, yet we find motor truck competitors offering "bargain rates" and other devices to attract traffic away from the railroads. Methods that are unlawful with relation to railroads should be equally without legality for competing transportation services.

M. H. Cahill, president, Missouri-Kansas-Texas.—It has been perfectly obvious that the decrease in railroad revenues in 1930 was not due entirely to commercial depression, and it is equally obvious that the rate of railroad recovery will depend largely on effective legislative action enabling the railroads to meet the competition of other carrying agencies on a basis more nearly approaching equality. So long as the railroads must continue to combat this competition under the present unfair conditions, they cannot hope to share relatively in renewed commercial activities. Happily, the present situation promises legislative action in southwestern states this winter that will, in some degree, remedy conditions with respect to highway transportation. I do not anticipate that the effects of such legislative action will influence material increase in railroad passenger revenues, but it should check further inroads in this field. From a railroad revenue standpoint, however, effective regulation of freight transport on the highways will produce more important results. Under present conditions, southwestern railroads are feeling the effects of truck transportation in increasing degree. Our losses in revenue the past season as a result of the trucking of cotton to ports, over distances running up to 300 miles, have been larger than ever before. Highway transport of freight has affected railroad revenues everywhere, but our most substantial loss has been in the cotton traffic.

Truck Rates Below Cost

R. B. White, president, Central Railroad Company of New Jersey.—Motor coach and motor truck competition on the highways, in many cases paralleling the rail lines, is constantly increasing and making inroads on rail revenues, with the trucks in some cases coordinating with water and barge movements. Competition between motor truck interests themselves, has resulted not only in loss of traffic to steam roads, but in rate reductions by motor truck interests to a basis equal to, and in some instances, less than actual cost,—making it extremely difficult for rail lines to retain or increase certain classes of their tonnage.

To illustrate the coordination of barge and truck movements—certain companies in New Jersey transport their commodities by barge to locations at other points reached by water, where distribution is made to numerous inland points by motor truck—the loss to rail carriers in merely two instances of this kind amounting in the aggregate to $250,000 to $300,000 per annum.

Thus you will see that not only are the railroads feeling the effects of the general business depression, reflected in declining traffic and revenues—but they also labor under several handicaps, among which may be mentioned unfair and unregulated highway competition; subsidized competition; excessive taxation, and discriminatory legislation.

Railway's Tax Burden Abnormal

To be more specific,—in New Jersey the state taxes paid by railroads are in excess of $20,000,000 per annum, to which amount should be added several millions for local taxes, paid by railroads to municipalities, and other taxing districts. This abnormal tax burden combined with the constantly increasing competition by trucks, buses, pipe lines and water carriers, which are coddled by freedom from regulation, inadequate taxation, and government subsidy; subjecting the railroads to rigid regulation, as contrasted with unregulated competition—and the fact that prices charged railroads, for material and supplies have not fallen to the same extent as commodity prices generally—these are the more serious handicaps confronting the railroads today.

Regardless of these disadvantages, we feel that with fair treatment accorded the railroads, by taxing, ratemaking and regulatory bodies, which the carriers have

a right to expect, they will be able to meet their problems in a satisfactory manner.

J. J. Bernet, president, Chesapeake & Ohio.—Motor coach competition is increasing, but the owner-driven automobile is chiefly responsible for the loss of railroad passenger traffic. We do not favor reduction of passenger fares for travel in day coaches at this time.

Motor truck competition is having an increasing effect upon merchandise freight traffic of the railroads in our territory. Transportation by motor vehicles, both passenger and freight, particularly in interstate commerce, should be properly regulated and the railroads should work and co-operate to that end.

Experiment Advisable with Passenger Rates

H. A. Scandrett, president, Chicago, Milwaukee, St. Paul & Pacific.—I do not believe the severity of motor coach competition has increased substantially in our territory during the past twelve months. The decline in passenger revenues during the past ten months has been about 10 per cent in sleeping and parlor cars, and 60 per cent in coaches, which shows that the greater loss has been in the latter. This is attributable mainly, I think, to two facts, first, that the short haul traffic which has been the harder hit is largely coach travel, and second, speaking generally, the lower fares available by motor coach are more of a factor with patrons of coach travel. Whether lower passenger fares would secure a sufficient increase in traffic to compensate the railroad is a matter of opinion, and the only way to determine this is by experiment. We are now putting into effect as an experiment a one-way fare of two cents per mile, good in coaches, on selected divisions in Wisconsin, Iowa, and Minnesota, where there is bus competition locally, and the territory is such that the reduction will not affect our competitors or reduce through rates between key or important points. A further experiment that will be put into effect by transcontinental lines on January 1 is a three-fare basis on one-way traffic between Chicago and the Pacific coast. A lower fare than the standard fare will be applicable in tourist cars and a still lower fare in coaches.

I am unable to give you any definite information respecting freight traffic being taken by motor trucks, as trucking companies are not required to make reports to public authorities. All I can say is that approximately 500 motor trucking companies are in direct competition with us and, of course, they are making substantial inroads into our traffic. In addition, we have the competition of a very large number of privately owned and operated motor trucks.

Decline Will Continue

J. S. Pyeatt, president, Denver & Rio Grande Western.—The decline in railway passenger revenues will continue because of the ever increasing competition of motor buses and the more general use of private automobiles, unless the railways adopt definite measures that will meet such competition. We have advocated for some time a basis of railway coach passenger fares sufficiently low to meet the cost of motor bus travel, believing such action would definitely restore at least a considerable portion of the traffic which has been lost to the railways. In pursuance of this theory, recently we have joined with some of our direct connections in a movement to establish three classes of passenger fares between Chicago, St. Louis and the Pacific coast which materially reduces the rates in coaches and tourist sleepers.

Our less than carload freight traffic has shrunk 17 per cent since 1925, notwithstanding the substantial growth of such traffic in that period, entirely due to motor truck competition, public and private. The flow of this traffic away from the railroads and to motor transportation has been due very largely to the convenience of pick-up and delivery service offered by the trucks. The absence of proper regulation of motor transportation has made it difficult for the railways to meet that competition. Our company, through a subsidiary, now has application pending before the State Utilities Commissions in which it seeks the approval of establishing pick-up and delivery service, which, if granted, we believe will enable us to recover a portion of that traffic, but, of course, at considerable expense to the railway.

Competition of Inland Waterways

No. 4.—What have been the effects, and what do you regard as the probable effects, of the government's inland waterway policy upon the traffic of the railways in your territory?

J. J. Pelley, president, New York, New Haven & Hartford.—In general, the inland waterways policy of the government has not affected the earnings of the New England roads. The Panama canal has diverted a large volume of tonnage from the railways, including those in New England. The purchase of the Cape Cod canal by the federal government, with its free toll, and the through service being provided by unregulated steamship lines on Long Island Sound in connection with independent motor truck lines, have had a serious effect on the railroads' traffic and revenues to and from New York. The principal danger from future waterways competition lies not so much in the volume of traffic likely to be diverted from the rails, because water movement is slow, as from the constant whittling of rail rates in an attempt to bring them down to the level of water rates.

Railways Need Fourth Section Relief

J. M. Kurn, president, St. Louis-San Francisco.—Operation of the government inland waterways has created such a well known condition that I question if I could add much to what has been said on the subject. Briefly, my contention is, that the government has gone as far as it should possibly go with the use of the taxpayers' money in improving the channels of the inland waterways. The operation should be that of individuals and the individual operation should be under the same control, both as to regulation and penalties for violation thereof, as the railroads.

Paul Shoup, president, Southern Pacific.—The effects of the government's inland waterway policy, as demonstrated by operation of the Mississippi-Warrior service, have been to deprive the rail carriers of a haul on a substantial tonnage of transcontinental freight without adding, as we see it, any material benefit to the ultimate consumer. Perhaps no better illustration could be thought of in that respect than as noted by the movement of sugar. For a great many years the railroads transported a very substantial tonnage of sugar from California to Chicago and points on the Mississippi river, such as St. Louis, including points in the Mississippi river valley. The bulk of that tonnage now seeks the all-water route; the Panama canal ships dock directly at the wharf of the sugar company at Crockett, and discharge at New Orleans. Some of the tonnage moves directly up the river by barge line, and some of it goes into storage at New Orleans, to be later barged up the river. The combined cost of shipping via the all-water route is less than the rail carriers have felt they could

afford to establish—without relief from the provision of the fourth section of the Interstate Commerce act.

Waterways' Effect Wholly Harmful

It would seem a fair assumption that the probable effects of future inland waterways development by the government would be no different from that which has been experienced by the railroads as a result of the government's present operations on the Mississippi river.

If the government continues operation of transportation service on inland waterways, such action is bound to have a very detrimental effect upon the rail carriers, forcing upon them, as it does, unfair competition through government operation, free from taxation, and in fact, subsidized by taxation of the public.

Ralph Budd, president, Great Northern.—Inland waterway transportation is not directly in competition with the Great Northern, but it does affect the Burlington, in which the Great Northern owns substantially a half interest.

Cause Rate Complexities

J. J. Bernet, president, Chesapeake & Ohio.—Inland waterways have not seriously affected freight traffic of the railways in our territory up to this time. The government's inland waterway policy is affecting rate adjustments and is expected to prove increasingly serious in the future.

J. S. Pyeatt, president, Denver & Rio Grande Western.—The policy of the government in continually authorizing huge subsidies to inland waterways cannot be justified by sound economic principles. The benefits to the public are entirely out of proportion to the cost paid in taxes. The railroads need the traffic and should be allowed to handle it at reasonable rates prescribed by properly constituted bodies.

H. A. Scandrett, president, Chicago, Milwaukee, St. Paul & Pacific.—The effect of the government's inland waterway policy, and particularly the operation by the government of its own barge lines on such waterways has been to take traffic in substantial amounts from the railroads, and the continuance and expansion of these activities will result in increasing the diversions of traffic from rail lines in this territory. The propriety of these governmental activities, with the requirement imposed on rail carriers as to joint rates and divisions thereof with barge lines operated on inland waterways is too big a question to discuss in a brief review such as this.

Policy Menaces General Business

L. A. Downs, president, Illinois Central.—The policy of the United States government in respect to inland waterways is a menace not only to the railroads as business enterprises but also to virtually all the large groups into which the population of the country might be divided. The traffic loss to the railroads in our territory has been considerable, and the gain to the public has not been commensurate therewith. No fault is to be found with the development and use of inland waterways where the real saving effected more than offsets the relatively inferior value of the service. However, when it is considered that inland waterway service on the whole is worth only about 80 per cent of railway service, judging from the rates necessary to divert traffic, a material saving must be effected beyond the 20 per cent differential in order to compensate for the hidden costs of improving and maintaining the water routes. Progress has been made in presenting this situation to the public, but vastly more must be made.

Carl R. Gray, president, Union Pacific.—The government policy with respect to the operation of waterways in this territory has not been determined. The railways have not opposed improvement of the waterways, per se, but they are opposed to government operation at a loss. It is elementally unfair for the government to operate in competition with the railroads where private capital will not take the risk, and make up the deficit through taxation.

J. M. Davis, president, Delaware, Lackawanna & Western.—The New York state barge canal, which is state owned and maintained with the taxpayers' money, as you know, according to reports, handled 2,876,160 tons of freight in 1929, at a ton-mile cost which was almost twice as great as the rail cost would have been. If the regular rail rate had been paid for moving this traffic and the canal forgotten, the taxpayers would have been money in pocket. Either of the railroads operating between Buffalo and New York could have accommodated this additional traffic without difficulty. Under such circumstances, I fail to recognize the advantage of this canal or who received such advantage, if there be any.

I understand that some 50,000 tons of rubber moved this year by canal to Lake Erie ports and was then trucked into the Akron district.

Becoming More Serious

C. T. Jaffray, president, Minneapolis, St. Paul & Sault Ste. Marie.—As yet we have not felt the competition of the inland waterways to any great extent. In the first place, their equipment has not been of the best and in the second place the uncertainty as to the arrival of merchandise shipped by barge has kept shippers from using this facility. However, if the plans of the government which are now in prospect are carried out and a nine-foot channel is completed to Minneapolis and the government furnishes the equipment and does the work (which apparently is the plan at the present time) there is no doubt that the earnings of the northwestern railroads would be rather seriously affected.

M. H. Cahill, president, Missouri-Kansas-Texas.—Further development of the government inland waterway policy will, of course, continue to affect the revenues of southwestern railways adversely. This policy has already diverted a substantial volume of traffic from the railroads and it will be increasingly hurtful as it is extended. Whatever the trend of business generally, there must be some increased recognition in public policies, of the railroad's place in the country's transportation scheme before the railroads may count with complete confidence on regaining the traffic volume of 1929.

Injurious to Savannah's Industry

A. E. Clift, president, Central of Georgia.—The direct effect on the Central of Georgia railway of the government's inland waterways policy has been to deprive Savannah, the Atlantic port served by it, of tonnage moving to, from and through this port to and from territory competitive between this port and the Gulf ports served by the government's inland waterways service where the rail rates are the measure of competition; and continuance of this policy, it seems to me, will be to practically destroy commerce of industries at ports not served by the government's inland waterways service for the reason that industries not served by the government's subsidized inland waterways service cannot compete with industries whose commerce is subsidized by the government.

Except to the extent above indicated the government's inland waterway service is not a direct competitor of the Central of Georgia railway, but rather a connection. The traffic of the railroads coming in direct competition with

the government's inland waterways service along the Mississippi and Warrior rivers is more seriously affected than that of the Central of Georgia railway.

J. E. Gorman, president, Chicago, Rock Island & Pacific.—Thus far the government's inland waterway policy has not been developed to an extent to detract to an appreciable degree from the railroads' revenues. However, when it has been developed to the point where railroads will be forced to carry rates and participate in traffic moving via Illinois and Mississippi river ports of call, originating in Illinois, Indiana, Michigan, and other eastern states, destined to river ports or points beyond, involving: rail and barge hauls; barge and rail hauls; rail, barge and rail hauls; it is going to deprive railroads of such a large volume of traffic that it will seriously reduce the revenues.

W. L. Ross, president, New York, Chicago & St. Louis.—The subject of waterways is a vital one with the railroads at this time. It must sooner or later come to a head. Huge sums are being spent by the government in the interest of waterway transportation. It would be better and a whole lot cheaper for the government to pay the freight on the shipments moved via the inland waterways to the railroads, hauling the freight for nothing for the poor people who can't afford to pay the freight. I am not referring to the Great Lakes; I am referring to transportation on the Mississippi river, Ohio river, Missouri river, and canals of various kinds all over the country. A study just made indicates that the shippers pay less than 4½ mills per ton mile to the Mississippi-Warrior line; and it costs to operate the Warrior line, which is owned by the government, about 11 mills per ton mile, to say nothing of the cost of keeping the river in shape, which the government pays. You can see by this that there is a subsidy paid to the Warrior line of about ½ cent a ton mile or so, which goes to the shippers. This comes out of the taxpayers' money. I don't know of any reason why the government should be in the shipping business in competition with the railroads, forcing us to maintain certain rates on all traffic, at the expense of the taxpayers, for half of what it costs to operate the service.

An Injustice to Every Taxpayer

F. E. Williamson, president, Chicago, Burlington & Quincy.—There is no doubt that improvement of the inland waterways will divert traffic from the railways, particularly if there is no comparable regulation of competitive rates. While we do not oppose development of any natural resources, obviously, some of these projects are too costly for the business involved, and merely to create another means of transportation when existing systems are adequate and efficient both as to transportation costs and rates. Operation by the government of water transportation on public money at inadequate rates and paying no taxes, is unjust not only to the railroads but all taxpayers.

Effects of Maintenance Retrenchments

No. 5.—Have the reductions in maintenance expenditures made by the railways this year impaired the condition of the properties, and how much longer can they continue such retrenchments without producing an adverse effect upon the transportation service they can render to the public?

L. A. Downs, president, Illinois Central.—Insofar as the Illinois Central system is concerned, the property was in such excellent condition at the beginning of 1930 that reduced maintenance has neither impaired its condition nor adversely affected the service rendered the public. Not all the reduction in maintenance expense, however, represents a reduction in maintenance work. The pressure of necessity has made us find better and cheaper methods, a development which should be reflected in financial results when the situation improves.

M. H. Cahill, president, Missouri-Kansas-Texas.—Reductions in maintenance expenditures made necessary by 1930 conditions have not measurably impaired the physical condition of southwestern railroads, and slight revival of traffic and revenue will permit expenditures adequate to normal maintenance requirements.

Railways Have Excess Capacity

J. J. Pelley, president, New York, New Haven & Hartford.—The reductions in maintenance expenditures made by the railways this year have not generally impaired the condition of the properties, inasmuch as a large part of the retrenchment has been made possible by the fact that a surplus of stored equipment, not requiring maintenance, has resulted from the business depression and the extremely light traffic eases the maintenance necessities of tracks and allied facilities. Such a condition cannot continue indefinitely, but, because of the excess plant capacity existing in the transportation industry, the railroads doubtless can continue at 1930 levels for some time without producing an adverse effect upon the transportation service they render to the public.

Paul Shoup, president, Southern Pacific.—Such reductions as were made in our maintenance expenditures during 1930, compared with such expenditures in former years, have not in any way impaired the condition of our property, as over a long period of years we have each year expended very large sums of money in improvement and maintenance work, and the lines are in excellent physical condition; and with any improvement in the general business situation, we will be in fine position to handle whatever traffic may be offered.

C. T. Jaffray, president, Minneapolis, St. Paul & Sault Ste. Marie.—While we have made certain reductions in maintenance expenditures during the past six months and will probably keep up the reduction for at least the first six months of next year, we do not think this reduction has in any way affected or impaired the condition of the property. Of course, this cannot go on very much longer without having some effect upon the railroads ability to take care of the business offered.

Retrenchment Cannot Safely Continue Long

J. E. Gorman, president, Chicago, Rock Island & Pacific.—It is thought that the reductions in maintenance expenditures during the year 1930 will not impair the condition of the properties, because of the large expenditures for maintenance during the previous years and the capital expenditures for new and improved equipment and facilities. However, if account of lack of revenue it is found necessary to control maintenance expenditures for a much longer period it will have its effect upon the condition of the properties, and such retrenchment would produce adverse effect upon the transportation service the railroads could render.

A. E. Clift, president, Central of Georgia.—The condition of our property has not been materially impaired by reduction in maintenance expenditures. The length of time for which current retrenchments can be extended without deterioration of service resulting depends upon

weather conditions and upon the total volume of traffic.

J. M. Kurn, president, St. Louis-San Francisco.—Speaking for the property of the Frisco, have a very high regard for the continuance of maintenances and what we have accomplished has not been to the embarrassment of the property. As to how long continued retrenchments can go without an adverse effect on transportation service, that is a matter which one can readily say should not and cannot be indefinitely prolonged.

F. E. Williamson, president, Chicago, Burlington & Quincy.—The reduction in maintenance expenditures will not be continued to such an extent as to impair the condition of the properties. The traffic requirements the past year have been considerably less, so some of the retrenchment was based on immediate requirements, particularly in maintenance of equipment. It is certain that all well managed railroads will spend sufficient to keep their properties in safe and adequate conditions for present efficient transportation, so long as they are able to do so.

J. M. Davis, president, Delaware, Lackawanna & Western.—The Lackawanna held closely to its regular maintenance program for 1930.

Ralph Budd, president, Great Northern.—The Great Northern has kept its property in the highest state of maintenance and expects to continue to do so. The roads which have been able to follow this policy could probably stand some retrenchment for a short time without producing an adverse effect on the transportation service; but the roads which have to retrench most severely are usually those which are not in the best physical condition, and in such cases the retrenchment soon becomes very serious.

J. J. Bernet, president, Chesapeake & Ohio.—Reductions in maintenance expenditures have not as yet seriously impaired the general conditions of railway properties in this territory within the range of my observation.

Effect on Railway Service

H. A. Scandrett, president, Chicago, Milwaukee, St. Paul & Pacific.—In our own case the reductions in maintenance expenditures this year have not been at the expense of the property. It will not, in my judgment, result in what is termed deferred maintenance. This does not mean, however, that we could continue indefinitely the maintenance program of 1930 without its resulting in an impairment of the service rendered the public.

J. S. Pyeatt, president, Denver & Rio Grande Western.—Unless it is assumed that maintenance expenditures have been unnecessarily high in the past, which I do not believe is true, the impairment of the physical properties practically begins with the decline in such expenditures which has been drastic during the past year and, if continued through another year, will without question be reflected in the service they render.

Consolidations and the Railway Situation

No. 6.—To what extent do you believe that action by Congress authorizing the railways to proceed under the supervision of the Interstate Commerce Commission with consolidations would contribute toward improvement of the present railway situation?

Paul Shoup, president, Southern Pacific.—As to railway consolidations, we believe Congressional action permitting voluntary consolidations, under the control of the Interstate Commerce Commission, will help in improving the railroad situation insofar as the consolidations can be made a factor in reducing expenses and creating efficiency. Considering the railroad problem as a whole, the gain through consolidations in improving net revenues will not be very great. In some cases there is unquestionably a marked value to both public and security owners. The result of all consolidations that might be beneficial and could reasonably be carried out would not be an offset to any of the factors of importance working against the satisfactory maintenance of the railroad industry, such as the subsidized transportation by water and highway, the government going into the transportation business on water itself, the failure to permit the railroads to engage in waterway transportation, or to meet the competition of waterways through fourth section relief, the increasing burden of taxation, including non-productive expenditures required by the public, such as paving, new highway crossings, and so on, or the whittling away of revenues following the competition of different sections whose commodities seek a common market, or the efforts of commissions to help certain industries by blanket reductions in freight rates.

Would Aid Future Planning

R. B. White, president, Central Railroad Company of New Jersey.—Legislation, authorizing the railways to proceed under the supervision of the Interstate Commerce Commission with consolidations, or a definite decision or program in the matter of consolidations, would enable railroad managements to base plans for the future, and be helpful at least to the extent of removing the existing uncertainty concerning this question.

C. T. Jaffray, president, Minneapolis, St. Paul & Sault Ste Marie.—Consolidations if authorized by the Interstate Commerce Commission would unquestionably in some cases be worth while because of the ability to cut expenses and in many instances to reduce duplications of service and other facilities now given the public.

L. A. Downs, president, Illinois Central.—Consolidation is not a material factor in the present railway situation. On the whole, the railroads as now constituted are giving the best service that the American public has ever known, and there are comparatively few economies to be realized by changing the railway map of the country. However, it is highly desirable that the uncertainties created by the inability to make progress under the present laws be eliminated through the enactment of permissive legislation.

Ralph Budd, president, Great Northern.—Further legislation to simplify the making of railway consolidations would be helpful.

Carl R. Gray, president, Union Pacific.—Speaking from a western standpoint, I do not believe that any change in the law with respect to consolidations would of itself contribute toward improving the present railroad situation. However, relief from the present rigid conditions would undoubtedly stimulate consideration of such matters and, to a degree, facilitate their consummation, but not so as to affect the present situation.

A. E. Clift, president, Central of Georgia.—It has always been my opinion that consolidation of railway properties should be permitted to progress in a natural and orderly way.

Hopeful of Public Understanding

May I volunteer my conviction that the outlook for the railroads is improved because of a better understanding of transportation matters by the people, and because of many evidences of co-operation, support and friendly sentiment on the part of the public. This in-

formed public opinion will, it is hoped, result in national and state legislation to equalize the competitive transportation situation.

F. E. Williamson, president, Chicago, Burlington & Quincy.—While there has been less agitation recently for consolidations of railway properties, the long run situation has not changed, and the provisions of the Transportation act can only be worked out in practice by consolidating the properties into several large systems, making is possible to then regulate rates so as to afford the lawful return.

J. J. Pelley, president, New York, New Haven & Hartford.—If the matter of consolidation were allowed to proceed to some tangible conclusion, certain financial and operating economies would result which would improve the present railway situation. However, it must be remembered that the present situation is in large measure one which has been brought about by conditions which the railways cannot control. This applies specifically to the loss of traffic suffered by the carriers through competition from unregulated and subsidized sources.

Greater Relief From Other Sources

J. E. Gorman, president, Chicago, Rock Island & Pacific.—To what extent the present railway situation would benefit by consolidations under supervision of the Interstate Commerce Commission could only be determined by a thorough study of the lines of railroads involved in the consolidations. However, at this time, the opinion of those engaged in the railroad business seems to be that the greatest measure of relief would flow from a more liberal policy of the regulatory bodies toward the railroads, together with regulation by state commissions and the Interstate Commerce Commission of buses, trucks and pipe lines, in order that such forms of transportation would be placed on a parity with the railroads.

Consolidation Will Continue

J. M. Davis, president, Delaware, Lackawanna & Western.—I believe the gradual consolidation of railroads will continue just as it has for the past 30 or 40 years. As little new-railroad construction is going on, the obvious result will be a lessening of the number of independent lines. That the public will derive the great benefits which it is led to expect from the wholesale consolidation of railroads, however, is difficult to believe.

W. L. Ross, president, New York, Chicago & St. Louis.—I am more firmly convinced now than ever before that consolidation is an imperative need. I know of no substitute for effecting economies on a large scale, for improving services and minimizing transportation waste and duplication. The greatest results are being achieved where managements are able to make the fullest use of facilities, and consolidation is a means to that end, as well as a means toward reaching necessary markets and of adjusting our transportation system to the economic changes and the expansion of commerce which have taken place. If, for example, our entire national system of railways were to be built anew today, it would include many changes from the old arrangement, with regard to routes, locations and the like. The system of course cannot be built anew; but there is a way to redevelop our railroads and to adapt them to the present and the future, and to my way of thinking that way is consolidation.

Would Be an Aid

J. J. Bernet, president, Chesapeake & Ohio.—Unification of railroads would contribute to improvement of the general railway situation. The present Interstate Commerce act permits unifications that would be effective in this regard and there would seem to be no especial need for legislation at this time.

J. S. Pyeatt, president, Denver & Rio Grande Western.—The principle of consolidations into a few systems I think is sound and should result in material economy, provided such systems are well conceived and not too large.

H. A. Scandrett, president, Chicago, Milwaukee, St. Paul & Pacific.—There are many railroad properties which if consolidated could give an improved service because of economies effected thereby. I do not believe in "wholesale" consolidations, nor do I believe they constitute a panacea.

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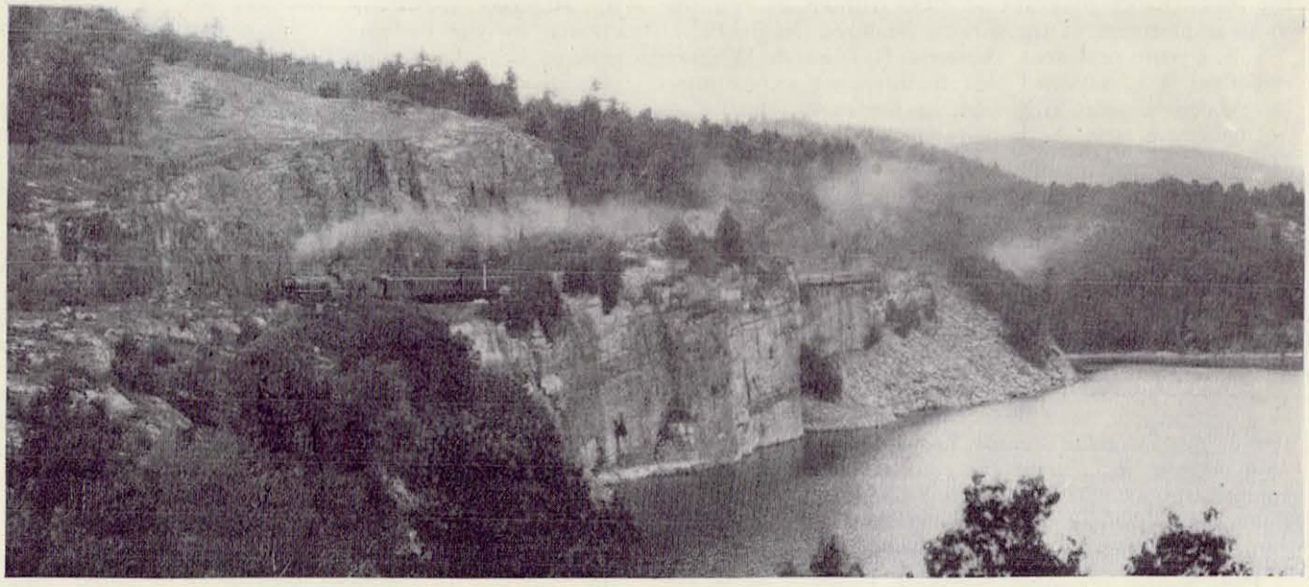
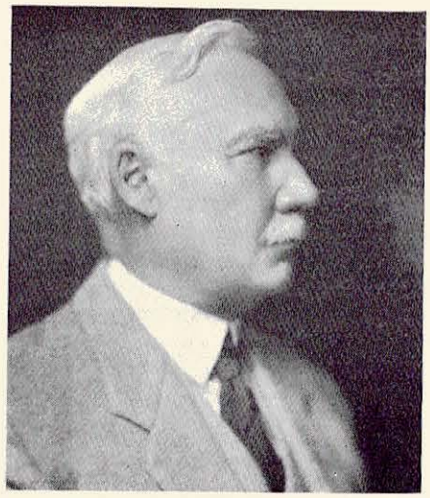


Courtesy of Delaware & Hudson Railroad

The Delaware & Hudson's "Laurentian," from Montreal to New York, at Willsboro Rocks, North of Willsboro and Port Kent, N. Y., Champlain Division



George E. Roberts

RAILROADS INDISPENSABLE!

Revenues must be sufficient, competitors must prove economic legitimacy and pay all their costs

By George E. Roberts

Vice-President, National City Bank, New York

TEN years have passed since the railroads were returned to the owners after the government, for the purpose of obtaining the highest possible co-ordination in war times, had conducted operations for two years, with the willing aid of the experienced railroad officers. During that period of co-ordinated operations, general policies, as regards relations with employees and the public, were determined by government officers. As might be expected, they inclined to liberality both ways, with the result that under this control net operating income rapidly declined because of increased operating expenses.

The Transportation Act of 1920 was largely the work of Senator Cummins, an able lawyer, whose rise in political life had been based mainly upon an independent and aggressive attitude against railroad activities in politics. He was under no obligations to the railroads, his political support having been chiefly from the element that was critical of and antagonistic to the railroads. However, he had a disciplined mind, trained in the law, and he sought a fair and constructive solution of the railroad problem, which had been involved in the politics of the west for fifty years.

Esch and Cummins Not Railway Partisans

In the House, John J. Esch, chairman of the Committee on Interstate Commerce, was working upon a similar measure independently, and it passed the House. The two bills were merged into the final form in the Conference Committee and it is not necessary here to attempt to divide the credit for authorship. Mr. Esch had been in the House many years, from Wisconsin, during the time when anti-railroad feeling had dominated the politics of that state. Thus the Transportation Act was mainly the work of two men, neither of whom could be said with any fairness to have been partial to the railroads.

The measure by no means satisfied either side of the railroad controversy, but I will not discuss the disagreements. Following upon the regulatory measures of President Roosevelt's time it was intended to enlarge and confirm the powers of the Interstate Commerce Commission, but also to give the roads a more secure financial basis by assuring more definitely their right to earn a fair return upon invested capital.

The authors of the measure were convinced of the impracticability of government ownership and management, and recognized that unless private ownership had a fair assurance of returns corresponding approximately to what might be had from other classes of investments, capital would not be available for the proper development and maintenance of the roads.

Necessity of Security for Investors

"Any legislation," said Senator Cummins, "which may be proposed upon the hypothesis of private ownership and operation must tender to the future investor reasonable security for the investment he is asked to make and reasonable assurance of such yearly return upon his money as will induce him to enter the field. The better the security and the more certain the return, the less will be the rate required to attract investment." This sound principle was sought to be embodied in the new act.

The roads were guaranteed returns while in the hands of the government, and funds for necessary capital expenditures were provided by the Treasury, inasmuch as the public market was practically closed to private financing. They were received back by the owners subject to this indebtedness, with the properties deteriorated, operating organizations demoralized, expenses at a very high level, and with pressing needs for capital at a time when the capital market was so congested by government issues that Liberty bonds were selling considerably below par.

Under these conditions the Congress was impressed that railroad credit must be supported by more definite assurances regarding rate-making policies than had been given theretofore.

Promise of Fair Return Made Funds Available

Accordingly this act contained a provision directing the Commission to fix rates with a view to enabling the roads to earn a fair return upon the aggregate value of railroad property used for transportation, and furthermore, took the initiative in determining what should be deemed a fair return. It names for the period of two years from March 1, 1920, a sum equal to 5½ per cent of such aggregate value, and authorized the Commission in its discretion to add a further one-half per cent for improvements, betterments or equipment chargeable to capital account. It did not guarantee any returns to the roads

individually, but provided for an aggregate return, requiring them to compete in the division of it.

On the strength of this legislation the railroad managements went into the capital market and were able to obtain funds to greatly improve the physical condition of the properties, add to their equipment and reduce in marked degree their operating costs. In 1920 the Interstate Commerce Commission estimated the value of railroad property devoted to transportation at $18,900,000,000. Since then to the end of 1929 the companies had made net investments (gross investment less depreciation) in the railroad plant totaling $4,700,000,000. Therefore, the indicated valuation of the railroads today approximates $23,600,000,000. These figures are based upon the method of valuation adopted by the Commission in the O'Fallon case. The expenditures thus provided for have resulted in a marked gain of efficiency of railroad operations. The Bureau of Railway Economics has constructed an index of operating efficiency, based upon a combination of thirteen factors of railway performance, including averages for both freight and passenger service, which seems to be a reasonably accurate measure. Taking the record of performance in the five years 1920-1924 as 100 the index figure for 1929 is 121.1. Car-shortages have practically disappeared and without question the public is having better railway service than ever before.

Moreover, this improvement in efficiency has accomplished an important reduction in operating costs, which in 1929, excluding taxes, rentals, etc., were $1,324,600,000 less than they were in 1920, although the volume of traffic handled was substantially larger. The largest item of savings was by reduction of the number of employees. In 1920 the railroads employed 2,022,832 persons, while in 1928 the number was 1,686,769, a reduction of 336,063. Obviously this is a remarkable achievement. Thus have the railroads responded to the promise of more liberal treatment and such are the tangible benefits arising from an improvement in railroad credit.

Investment Made Lower Rates Possible

Without the increased investment and higher operating efficiency the railroads could not have handled the traffic at the scale of rates prevailing or have given the high standard of service to the public. This is plain from the following figures of operating income and expenses:

	(thousand omitted) 1920	1928	1929
Freight Revenue	$5,274,700*	$4,680,400	$4,815,000
Passenger Revenue	1,462,700*	901,000	872,000
All Other Revenue	574,000*	530,200	592,500
Total	$7,311,400*	$6,111,700	$6,279,500
All Operating Expenses	5,830,600	4,428,000	4,506,000
Balance	$1,480,800	1,683,700	1,773,500
Taxes, Rentals, etc.	333,600	510,800	521,800
Net Railway Operating Income	$1,147,200*	$1,172,900	$1,251,700

* Revenues shown for 1920 are not actual revenues, but a computation of what revenues would have been had the rate increase granted from September on been in force during the entire year. Net railway operating income in 1920 actually totaled only $17,226,902.

It will be seen that although gross operating revenues were down more than $1,000,000,000 in 1929 from 1920 (taking revenues for the year 1920 at what they would have been had the rate increase granted at the end of the guaranty period been applicable throughout the year), net operating income as a result of economies, was somewhat larger. Freight ton-miles handled were about 9 per cent larger in 1929 than in 1920, but passenger-miles fell off about 33 per cent, a result of automobile and bus competition. The gains by increased efficiency went to the public rather than to the railroad treasuries. This loss has been mainly due to the constant tendency to a reduction of rates under the pressure of popular appeals on the part of localities and groups of shippers, seeking their own advantage and indifferent to the results upon railroad earnings. If the average ton-mile and passenger-mile revenues of 1920 had applied to the 1929 traffic the total revenues of the latter year would have been approximately $890,000,000 larger.

It is a fact to be gravely considered by every person who appreciates the importance of railroad service that the definite pledge of fair treatment to investors in railroad properties has not been kept. The failure to keep it is undeniable and apparently explainable only as due to a greater regard for the pleas of shippers and railroad employees for favors at the expense of the roads than for the intent of the Transportation Act which they were charged with administering.

Promise of Fair Return Not Kept

In no single year since the Transportation Act was passed have the net earnings of the railroads equaled the standard return named in the act, the percentage calculation being based on the book values of the railroad companies. The Interstate Commerce Commission has not completed its valuation, but so far as the work has gone the results in the aggregate do not differ materially from the railroad figures used in this calculation. The calculated return by years, as made by the Bureau of Railway Economics, Washington, D. C., has been as follows by years:

Rate of return on investment

1920	0.21	1926	4.98
1921	2.84	1927	4.28
1922	3.58	1928	4.71
1923	4.33	1929	4.95
1924	4.21	1930	3.61
1925	4.73	(1930 figures for 6 mos. but yearly rate)	

A drop in net earnings for a single year or two, as in 1920-21 and in 1930 might be allowed for as due to fluctuations in the volume of traffic, but a period of ten years should show results on the average in compliance with the law, if the law is to mean anything. Such a record of public policy on the part of the responsible authorities must affect the confidence of the investors in the value of the pledge given by the act of Congress. Evidence of this feeling is seen in the present prices of railroad securities.

The attitude of the Interstate Commerce Commission reflects a new theory about transportation charges that has obtained considerable vogue of late—that they should be adapted to the ability of a shipper to pay, without regard to the cost of the service. This clearly is unsound. It is the theory of our legislation upon the subject that railway charges should be based upon costs, including a sufficient return upon the capital employed to induce the investment of the required amount. This is as far as it is possible to go in limiting charges and continue to have railroad service. After transportation is supplied at cost, production and trade must adapt themselves to the economic conditions. It is not conclusive to say that a certain business cannot be carried on at a certain place because transportation costs too much. Perhaps the business is in the wrong place and that the commodity should not be transported so great a distance. Perhaps the low price of the commodity is due to an excess of production, the ill effects of which are beyond the power of the transportation company to remedy.

Furthermore, the question of what is a fair return upon capital is not an abstract question that can be settled by an argument or the terms of a law. The authorities may believe that a certain rate of return is sufficient, but the investor has the last word. If he is uncertain about the return, or the rate is lower than can be had from

other investments comparably as safe, the capital will not be forthcoming. The greater certainty is attached to payment the lower the charge will be, because that is the condition which creates competition for investments.

During this ten year period under review the railroads have met with much new competition which has tended to divert traffic from them, and they face such competition in the future. Companies that had invested large sums in trolley lines as feeders have realized heavy losses upon them. Passenger traffic on the steam roads has constantly diminished, the coast to coast business has been hurt by the Panama Canal, and the growth of traffic has been affected by new conditions. In the decade 1900-1910 freight business increased 80 per cent and this was below the rate of preceding decades, but in the period from 1910 to 1920 the rate of increase fell to 62 per cent and from 1920 to 1929 was less than 9 per cent. In recent years the motor truck has become an important competitor, not only for package goods, but for such farm products as cotton and live stock, over considerable distances. Finally, there is a development of water transportation and growth of sentiment in favor of large expenditures of public money therefor.

The Commission itself touches upon these developments in its 1930 report, as follows:

> If railway finances were suffering only from the fact that a recession in business is being experienced as in other industries of this country and of the world, it might be sufficient to point out that in judging of railway income one should in fairness consider the good and bad years together. But a different and more threatening financial difficulty confronts the railways. This is the effect of the competition of other forms of transportation.

Having called attention to the decline of railway passenger earnings from 1920 to 1929 the commission continues:

> The prospect of a continued expansion in freight business to offset the further loss in passenger business is darkened by the competition of water lines, pipe lines, and trucks, and by changes that may check the growth in demand for ton-mileage, such as economy in the use of coal, changes in the location of industry, and the relatively slower growth of transportation.

Is Anyone Responsible?

The serious matter is the apparent lack of responsibility anywhere for the maintenance of railroad earnings. Every community is ready to attack them if local interests can be furthered by doing so. State and municipal authorities, Chambers of Commerce, popular agitation, will rally on short notice to support a movement to lower rates in which they are concerned. There is no defence for the rate structure except such as the Commission may give, and this defence has not been effective.

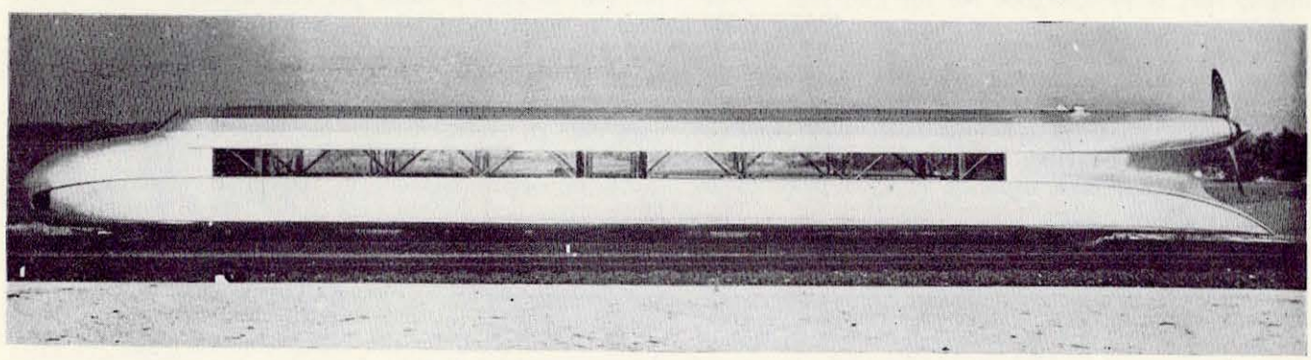
Also the railroads are hampered by numerous restrictive laws and requirements which have the effect of increasing costs without adequate benefits to the public. L. F. Loree, president of the Delaware & Hudson, estimates that 20,000 railroad stations are maintained in this country whose receipts do not equal the cost of keeping them open. As to operating regulations he says there are 36 arbitrarily restricting service and designed to make jobs, 27 classifications designed to arbitrarily increase pay, 29 requiring duplicate payments for one service and 16 requiring payments for services not performed.

While the railroads are in this position regarding control over revenues, they are in a similar position regarding control over expenditures. The National Industrial Conference Board in its study of "Wages in the United States in 1928," says that "the level of average wages for all wage-earners in railway service approaches the average for skilled and semi-skilled workers in the manufacturing industries." It says that average "hourly earnings in the train and engine service in 1928 were in the neighborhood of 90 cents, while weekly earnings were about $47. These figures are comparable with those for skilled and semi-skilled male wage-workers in manufacturing industries. The latter had average hourly earnings of 65.8 cents and average weekly earnings of $31.71." This showing may well be considered in connection with the recent action of the four railroad brotherhoods preliminary to the formulation of a demand for a reduction of the hours on duty from eight to six per day, with no reduction of pay. Obviously the railroads cannot accede to this demand without an allowance of increased revenues to cover it, and what would such an increase of tranportation costs mean to American business at this time?

Someone Must Pay for the Waste of Competition

Summing up, there seems to be a general lack of comprehension that the railroads are an indispensable factor in modern life, and that their revenues must be sufficient to pay operating expenses, maintain the properties and pay a fair return on the capital invested, or the properties will deteriorate. Whatever revenues are taken from them must be made up either from new sources or by higher charges on what traffic remains. That is the ultimate result of diversions of traffic to trucks, waterways, pipe lines and other competing transportation facilities.

Legitimate competition, on the basis of greater convenience or lower costs, must be accepted, but it should prove its economic value by being wholly self-sustaining, not supported by subsidies or favors which entail costs to the tax-paying public. It certainly is true that neither motor trucks nor waterways ever can take the place of the railroads. The railroad system is a fundamental necessity in American life, and sound economy requires that it be kept in a high state of efficiency. Failure to do so will mean far greater costs to the public than the costs required by faithful observance of the "fair return" policy contemplated in the Transportation Act of 1920.



Wide World Photo
Side View of the New German "Zeppelin Rail Car," Described in the Railway Age of November 15, 1930

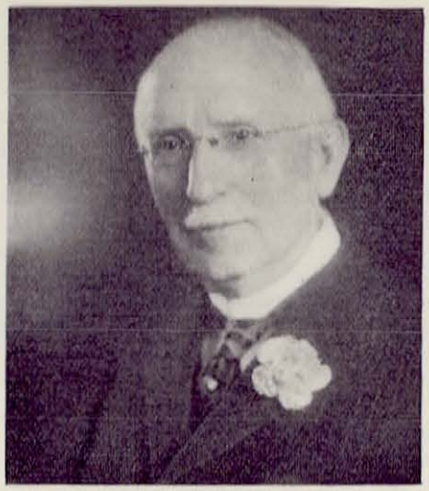
OUR FUTURE

Is Largely In Our Own Hands

Railways Need the Encouragement and Co-operation of Business Men

By Alba B. Johnson

President, Railway Business Association



Alba B. Johnson

BUSINESS for our guild in 1931 is wholly contingent upon general business conditions, which even some inveterate forecasters have ceased to predict. Estimating November and December, railway expenditures for maintenance of way, structures and equipment in 1930 were 16 per cent below the average of five years ended 1929. Except for a deduction for let-up in wear and tear due to lighter traffic, practically the whole outlay so deferred must be made up sooner or later, and will begin to be made up as soon as traffic recovery is definite. "Authorized" expenditures, carry-over plus new, which I cannot yet quote, are substantially in excess of amounts now intended to be certainly expended but ready to be financed and used in part when portents of recovery begin to appear.

Maintenance for the whole of 1930 is under 1925-29 by $330,000,000. Short of further decline in carloadings, it is believed that maintenance in the six months ended December 31, 1930—$842,000,000—was down as far as it will go.

Budgeted capital expenditures are not announced in a joint statement by the railways. The estimate given in December, 1929, by R. H. Aishton as president of the American Railway Association was the sum of figures furnished to him by individual roads through an extraordinary questionnaire not repeated in 1930. Such figures, however, are annually provided by the roads directly to Elmer T. Howson for his article in this statistical number of the *Railway Age*. Through the courtesy of the editor I am permitted to quote the 12 months total for the United States at $700,000,000. Roughly that is $350,000,000 for the half-year. Adding this to the estimate for maintenance, $842,000,000, we have $1,192,000,000. Comparing this with half the 1928 maintenance plus capital this is 11.1 per cent off; from 1929 it is 18.1 per cent off; from 1930 it is 9 per cent off. These percentages fairly well compare conditions in our field before and since the 1929 collapse with the expected situation in 1931 prior to an upturn in traffic.

Expenditures Depend On Traffic Recovery

The traffic recovery for which everyone hopes would initate a complex process. Mere restoration of current maintenance to the five-year average, 1925-29, would add $165,000,000 to the expenditures for the six months as estimated above. A vigorous resumption of earnings would be taken by the railroads to presage rapid expansion and an October strain on facilities. They would hasten to catch up with the arrearages and put the properties in thoroughly fit shape.

The capital "authorizations" are also elastic. If an item is for a piece of engineering construction and the work is financed and has started, it will go on until finished—possibly two years or more, appropriations being budgeted annually as needed. On the other hand, the same project "authorized" but not begun could and might be postponed for clearer financial skies. Postponable and interruptible always are "authorizations" for such staples as ballast, rail, cars and locomotives—"authorized," but the appropriations subject to conditions. An uncertain but undoubtedly considerable portion of this would come forth if the railway managers' confidence were strengthened and railway credit improved.

What proportion of the 1931 outlays will go into way and structures and what into rolling stock? Every man may draw his own conclusions as to future tendency from past and recent trends. In the bill for capital plus maintenance, way and structures rose unbrokenly from 35.7 per cent in 1923 to 48.1 per cent in 1928. Then that side fell to 47.7 per cent in 1929 and rose to 48 per cent in 1930.

Equipment Expenditures Tendencies

Of total capital expenditures for way and structures, "other improvements" than track, rail, ballast, shops and engine houses have risen almost steadily from 47.73 per cent in 1923 to 62.04 per cent in 1930. The chief item in this trend I take to be automatic train-control and other signal systems. Of total capital for equipment, locomotives 1923-26 averaged 24.43 per cent and in 1927-30 this had dropped to 23.95 per cent. Freight cars 1923-26 averaged 60.28 per cent, and 1927-30 only 54.85 per cent.

An important element in this drift affecting both locomotives and freight cars is the rise in capacity per unit. The rapidity with which old units are scrapped and replaced with new ones of increased capacity and economy is limited to some extent by governmental influence from a distinct angle. Federal corporation taxes are affected by the retirement of property, the replacement of which is charged to operating expenses

and so deducted from taxable income. Under the Transportation Act recapturable income is affected in the same way by replacements charged to operating expenses. It is the practice of the Treasury and of the Interstate Commerce Commission to have up on the carpet railroads which appear to be retiring locomotives and cars faster than usual. If a railroad decides to speed up the process of scrapping with a view to future economy in operating expenses, it has to face these two branches of the government, each of which has wide discretion, as it makes and interprets the rules.

Locomotive scrappage seems to have withstood this obstacle more successfully than car. Locomotives retired in the years 1924-26, averaging annually 2909, averaged 3502 in 1927-29, while the total tractive effort of those retired 1924-26 averaged annually 89.8 million pounds, as against 110.8 million pounds 1927-29. Freight car retirements on the other hand fell from an average of 112,507 units in 1924-26 to an average of 95,189 units in 1927-29, and retirement in tons capacity from an average of 26.4 millions 1924-26 to 7.2 millions 1927-29.

Light is thrown upon the stage that progress in types has reached by the character of the newly installed units. In view of certain operating limitations it has been wondered how long new locomotives would continue to increase in power and new freight cars in capacity. The new locomotives in 1924 averaged 50,075 tractive pounds, increasing in 1925 to 52,798 and in 1926 to 56,512; then after averaging 50,611 in 1927-29, the highest score in any year was made in 1930—an average of 56,559 tractive pounds. The significance of these annual averages, however, is obscured by our not being able to break the figures down into classes as to use. In a given year a railroad may install a number of locomotives of greater power each than any that it has previously acquired, yet the average tractive pounds of all its new units in that year may decline due to its purchase of a number of locomotives intended for lighter work on subordinate parts of the line. We do not know how nearly, in a consolidated report for all the roads, this levels itself out. The new cars have more steadily grown larger. From 48.27 tons in 1924 the average dropped in 1925 to 47.37, but from that point increased every year to 51.93 tons in 1930.

It is now cogently urged that old locomotives are not being replaced fast enough with more modern types. A year ago I quoted an eminent anonymous authority as believing that much the same comment applies to freight cars. In recent years the progress already made has shown aggregate tractive pounds of locomotives almost at a standstill, in some years decreasing; while the tons of freight-car capacity, including refrigerator cars transferred to private control, is now below 1926. Obviously in peak periods, which are the test, more car loadings per 1000 tractive pounds and per 1000 tons of car capacity in active service are hauled than formerly. The figures showing this are familiar to my readers. In part this result is due to improvement in types of rolling stock, which also reduces cost of operation. A large proportion, however, of the increase in peak-period performance per rated capacity must be ascribed to other efficiencies.

Equipment Used More Effectively

In speaking of the railway plant whose capacity is measured we mean the property as a whole—cars, locomotives, track, signals, yards, personnel, shippers' co-operation. A year ago in the *Railway Age* Dr. Parmelee, Director of the Bureau of Railway Economics, tabulated for 1929 new high operating records in freight car-miles per car-day, net ton-miles per car-day, gross and net tons per freight train, gross and net ton-miles per freight-train hour, freight-train speed, locomotive-miles per locomotive-day (freight and passenger). Bear in mind that the achievement of effecting an improvement in any one of these items is piled atop 10 years of concerted, incessant and successful effort to better practice as it stood when President Wilson relinquished the properties. Dr. Parmelee's index of "general operating efficiency" in 1929 was "nearly 3 per cent above 1928 and more than 25 per cent above 1922."

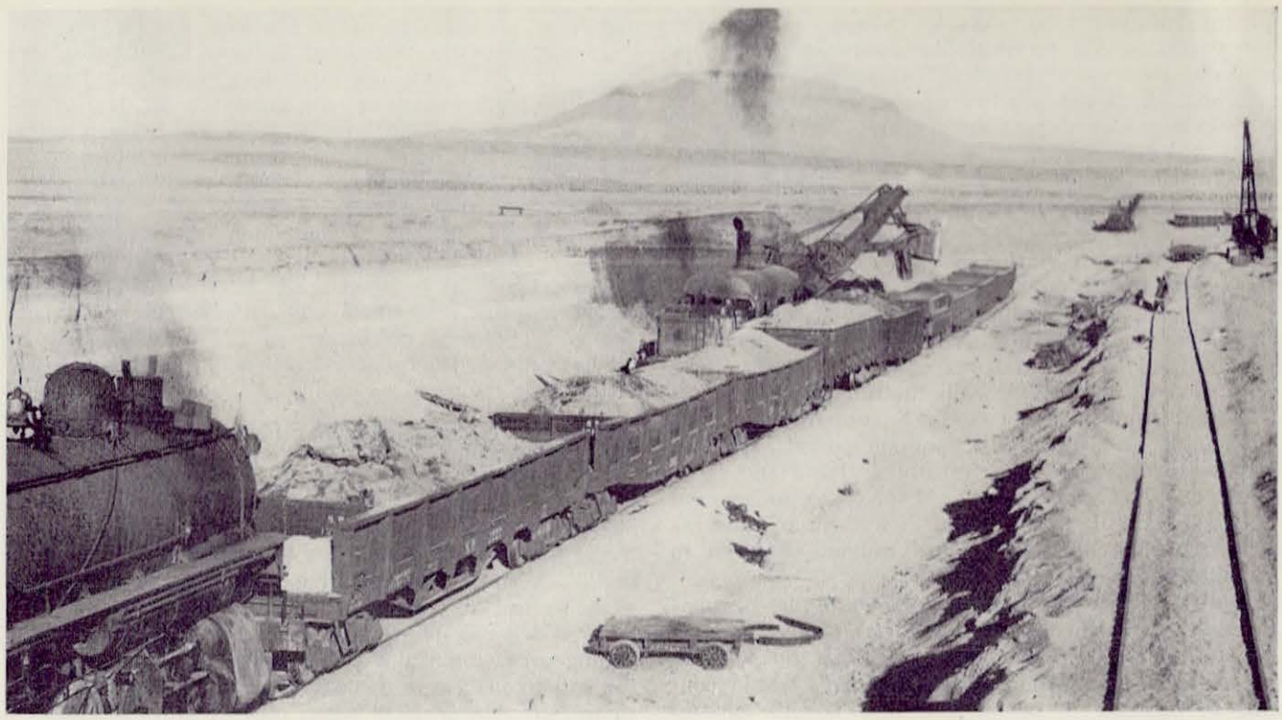
The Index of Efficiency

He tells me that for 1930 this index is down. By way of explanation the natural thought of the unsophisticated bystander is that in a period of slump in traffic there is a let-up in the pressure and a let-down in the exertion. The truth is the contrary. Nobody close to railway operation believes that management in 1930 relaxed its vigilance and driving energy. Declining gross intensifies the struggle for economy, and the call to save is in the ear of every employee. It is significant that in 1930 when other factors in the efficiency index were falling train-speed was rising. Train speed is within control of the railroad. If train load sagged this was because traffic slumped. Two men in the shop or on the track work harder than before when they see a third laid off, and it is the best workers that are kept on. There is no reason to doubt that when prosperity returns the index of efficiency will resume its progress. In any case it is manifest that the attention of the railway managers is now devoted intensively to a wider scope of progress than before the war, particularly since 1922. This tendency is reflected in the distribution of business of railway improvements as amongst the various branches of our industry.

Performance, in short, is the resultant of all factors. To the shipper it is simple: Do I get that car? Is that load delivered? To the railroads a high and rising standard in every department is requisite to give that shipper his car and deliver it. The number of revenue car loadings is the measure of railway performance. Length of haul, average load, promptness in shippers' handling and amount of dead-head traffic of its own using the railroad's facilities are merely factors which the railways must meet in satisfying the shipper. What the total freight car capacity tons can do, then, with existing plant at the apex of strain under conditions as found is measured by the actual number of revenue car loadings per 1000 active freight car capacity tons. In 1929 the peak four weeks ended October 19. At the date of the nearest report, November 1, the active freight car capacity was 95,749,212 tons. With these active cars the roads handled in the peak four weeks 4,745,676 revenue car loadings. This is 49.56 loadings per 1000 tons of active car capacity. At the 1923 peak this figure was 45.88, an increase in 1929 of 3.68.

Elsewhere I have recently invited attention to the persistence with which since the World War recovery from slumps has taken perhaps a year for liquidation and another year for the upswing to exceed the previous peak. The present industrial depression is now seen to have begun to show itself in or before June,

(*Continued on page 30*)



A Construction Program Requires Much Equipment

Railways Will Spend $800,000,000 For Improvements in 1931

Budgets for United States, Canadian and Mexican roads approximate 10-year average

By Elmer T. Howson

Western Editor, Railway Age

APPROXIMATELY $800,000,000 will be spent for improvements chargeable to capital account by the railways of the United States, Canada and Mexico during 1931. Of this amount, more than $700,000,000 will be expended by the roads of the United States. While these amounts are smaller than the actual expenditures during the year which has just closed, when the railways of North America spent about $1,000,000,000 and those of the United States somewhat more than $900,000,000 for capital account, these latter figures were larger than normal by reason of the response made by railway executives to President Hoover's appeal for the continuation of liberal improvement programs as a stabilization measure. If the activities of the last year are ignored, the programs projected for 1931 will not compare unfavorably with those of 1925-9, inclusive. In fact, they promise to exceed those of at least three of the last ten years and to come within 10 per cent of the average for this period.

These figures are based on an analysis of the budgets of roads with nearly 25 per cent of the total mileage of the three countries, and extending into widely separated parts of the continent, supplemented by statements from the chief executive officers of other roads as to their plans for the improvement of their properties.

Operating Charges Excluded

In using these figures, it should be borne in mind that they are confined to those expenditures that will be made for new equipment and for improvements and additions to existing properties, chargeable to capital account, and that, in addition, the roads will spend still greater amounts for the operation and maintenance of their existing properties. When contemplating the expenditures which the railways propose to make during 1931, one must consider also the liberality of their programs during recent years. This is particularly noteworthy during the year just closed wherein the railways, in an effort to co-operate with the national administration in stabilizing business and in the face of the most serious decline in traffic and in earnings since 1921, increased their expenditures for improvements more than $125,-

000,000 in the first nine months of 1930 as compared with the corresponding period of 1929, in spite of the fact that this latter period, in turn, recorded an increase of more than $73,000,000 in expenditures of this character as compared with the first three quarters of 1928.

A year ago we estimated that the railways of North America would spend $1,200,000,000 for improvements in 1930, and that of this amount $1,050,000,000 would be expended by the roads of the United States alone, this latter figure being the estimate given to President Hoover by the railway executives in their conference with him in November, 1929. The magnitude of this program is appreciated when one recalls that it exceeded the expenditures actually made during 1929 by nearly $200,000,000 and was larger than the amount spent for this purpose in any year since 1923. In spite of this fact, and also of the further fact that the roads experienced an increasing decline in earnings as the year developed, they entered into this program aggressively and actually exceeded the schedule that they had set for themselves in the first six months. As the summer progressed, however, and as the decline in traffic became more pronounced, there was some slackening of activity with the result that the expenditures for the year will probably not total much more than $900,000,000. Even this figure, however, has been exceeded only once since the period of federal control.

Spending to Cut Costs

So far as the new year is concerned, few railway officers anticipate any appreciable increase in traffic during the early months of 1931. With facilities far in excess of any demand that may reasonably be expected to be made during the current year, it is evident that the roads have little justification for incurring expenditures to increase capacity. There is, however, universal appreciation among railway officers of the fact that the marked reductions that have been effected in operating expenses in recent years have been made possible in large measure only by the liberal expenditures for improvements, and it is this incentive that is causing railway managements to look with favor upon further expenditures at a time when they have much surplus capacity. This is the impelling motive for the continuation of the improvement program on so large a scale during 1931.

Capital Expenditures—Class I Railroads

Calendar Year	Amount
1920	$653,267,000
1921	557,035,000
1922	429,273,000
1923	1,059,149,000
1924	874,743,000
1925	748,191,000
1926	885,086,000
1927	771,552,000
1928	676,665,000
1929	853,721,000
1930 (last three months estimated)	900,000,000

The improvement program for the new year, even though smaller than in 1930, is nevertheless noteworthy by reason of the further fact that it will mark the continuation of a policy of liberal expenditures for improvements which has been prosecuted without interruption since the return of the roads to private ownership in 1920. Since that time, and particularly beginning with 1923, the roads of the United States have made expenditures for the improvement of their properties at a rate never before approached. In this period of eight years, more than $6,750,000,000 has been spent for the enlargement and improvement of railway facilities, as shown in the accompanying table, or more than one-third as much as in the entire 90 years of railway development preceding 1923. It is as a result of these expenditures that the roads have been able to handle traffic so expeditiously and economically of late.

Conditions in Canada

The railways of Canada are experiencing the same decline in traffic and in earnings as those of the United States. As a result, their expenditures for improvements, largely for new lines in the prairie provinces, were curtailed sharply in 1930, and there is little prospect that the building of any considerable mileage of new lines will be undertaken this year, although it is to be expected that work on the relatively large mileage now under construction will be carried to completion. Of special interest is the expectation that work will be continued on numerous improvements to existing facilities, notably the outstanding terminal project of the Canadian National at Montreal, work on which is now in its early stages.

In Mexico, construction activities are expected, as during recent years, to be limited in volume during 1931, although with the gradual working out of the financial plans for the re-organization of the National Railway system, the outlook for greater stability of management and for better earnings will lead ultimately to further construction to reach areas not now served or served inadequately. Of equal or greater interest, from a construction standpoint, is the fact that economic studies are showing the possibility of large savings being effected by the consolidation of facilities of the various properties now merged into the National Railway system, as, for instance, the concentration into one station of the passenger traffic now entering Mexico City through four different stations, and the concentrating at four points of all of the maintenance of equipment heretofore handled at a large number of widely scattered terminals. As the savings from these measures become apparent, it is to be expected that still more ambitious reconstruction programs will be undertaken.

Limitations of This Analysis

In considering an analysis such as this, one must bear in mind the limitations under which it is necessarily made. In the first place, a considerable number, although a minority, of the roads do not prepare annual budgets but appropriate for improvements as the need arises and the funds are available. This group includes such prominent roads as the New York Central Lines, the Lehigh Valley and the Louisville & Nashville. Furthermore, a budget is, by nature, an *estimate* of the expenditures that a road expects to make during the year and is subject to revision as the year advances and the needs and the revenues become more apparent. It is, however, the best available index of the expenditures that are contemplated and is followed fairly accurately on most roads.

In attempting to summarize the expenditures which the different roads contemplate making during the year now opening, one also faces the fact that many of the railways delay the completion of their budgets until after the first of the new year, with the result that their figures are not available for incorporation in this survey. While this condition has become more pronounced in recent years with the exception of last year when President Hoover's appeal stimulated early decision, as the immediate need for additional facilities has disappeared, it is more than usually pronounced this year, for not a few executive officers hesitate to commit them-

selves to large expenditures in view of the uncertainty as to the trend of earnings in the new year.

In studying the budgets of the individual roads, one must also recognize the fact that not all of the projects listed thereon will be completed during the current year. Many projects, such as the Canadian National's terminal in Montreal just referred to, are of such magnitude that, of necessity, they extend over two or more years. Unexpected delays of one kind or another also frequently require the carrying over of work into the succeeding year. This is, however, a normal condition which prevails from year to year, although the amounts carried over may vary widely. Thus, unexpended appropriations totaling $624,310,000 were carried over into 1930, exceeding the similar amount carried over into 1929 by $56,000,000 which amount was, in turn, $51,000,000 larger than the year previous.

The Basis for Our Estimate

That the amount carried over into 1931 unexpended was materially less than a year ago, is self-evident, both by reason of the reduction in the number and size of the appropriations authorized in the later months of the year, and also because of the aggressiveness with which work has been prosecuted on those projects already authorized. While actual figures will not be available for several weeks, it is doubtful if the appropriations unexpended on December 31 and carried over into the new year exceed $400,000,000. To arrive at the total amount available for expenditure during the year now opening, the appropriations carried over from the preceding year should be added to those included in the budgets for the new year, although since a somewhat similar amount will probably be carried over unexpended into 1932, the total actually spent may be estimated to approximate that in the budgets.

In our study of the year's proposed expenditures, we have had access to the budgets of 20 roads with an aggregate mileage of 67,000. The total expenditures contemplated by these roads approximate $175,000,000. Included in these roads are 12 which gave us similar figures last year. The budgets of these 12 roads for the current year total $65,500,000 as compared with $85,200,000 last year. In other words, the expenditures now contemplated by these 12 roads are 23 per cent smaller than proposed by the same roads a year ago.

The roads which have provided us with complete or partial information regarding their contemplated expenditures include the following:

Atchison, Topeka & Santa Fe
Baltimore & Ohio
Boston & Maine
Central of Georgia
Central Railroad of New Jersey
Chicago, Indianapolis & Louisville
Delaware & Hudson
Delaware, Lackawanna & Western
Denver & Rio Grande Western
Duluth, Missabe & Northern
Elgin, Joliet & Eastern
Great Northern
Maine Central
Minneapolis, St. Paul & Sault Ste. Marie
Missouri-Kansas-Texas
Nashville, Chattanooga & St. Louis
Norfolk & Western
Reading
Southern Pacific (Texas & Louisiana Lines)
Union Pacific

Attitude of Executives

In addition to the data contained in the budgets furnished us by the various roads, a number of the leading executives of the larger railways have expressed their attitude towards improvement expenditures this year. In these expressions, these railway officers indicate a greater uncertainty regarding their programs, and greater dependence on the general business outlook than in any other year since this analysis has been undertaken.

Among the executives who are contemplating normal expenditures is J. J. Pelley, president of the New York, New Haven & Hartford, who anticipates that the capital expenditures for that road will be about the same as in 1930, although "with an improvement in business, they may possibly be greater." In a similar vein, W. B. Storey, president of the Atchison, Topeka & Santa Fe, advises that the addition and betterment program will be about normal, requiring from $20,000,000 to $25,000,000, in addition to $6,000,000 for new equipment just ordered. Slightly less optimistic is the attitude of Carl R. Gray, president of the Union Pacific system, who expresses the opinion that capital expenditures on that property will not be as heavy as in 1930, but should compare favorably with the average for the post-war years. Of like opinion is Ralph Budd, president of the Great Northern, who advises that the capital expenditures on that road in 1931 will be a little less than in 1930, adding that the Great Northern has spent more than $100,000,000 for improvements in the last seven years.

On not a few roads expenditures will be curtailed in 1931, as compared with the year immediately preceding, because of abnormally large expenditures in the immediate past. Thus, J. M. Davis, president of the Delaware, Lackawanna & Western, stated that expenditures on that road for capital account during 1931 "will fall considerably below those for 1930 which were unusually large because, holding to the letter of our promise to the president of the United States, we continued our construction program with the Jersey City terminal warehouse and freight station layout and our Northern Jersey suburban electrification project just as though business were normal, completing the former and all but completing the latter."

Division Between Roadway and Equipment

Expressing a similar thought, J. E. Gorman, president of the Chicago, Rock Island & Pacific, writes that "the expenditures in 1930 were enormous and were made in anticipation of handling a big volume of traffic which did not materialize, but rather was far below normal. It is felt that, on this account, the railroad's present facilities are more than sufficient to handle the traffic that may be expected in 1931." Also, H. A. Scandrett, president of the Chicago, Milwaukee, St. Paul & Pacific, advises that the capital expenditures on this road "for the first nine months of 1930 were some $5,000,000 in excess of the largest similar expenditure in the corresponding period of the last five years, and that the budget for 1931 will undoubtedly be considerably less than in 1930."

Still other executives are holding their plans in abeyance awaiting further and more positive indications regarding the trend of traffic. Such is the position of W. L. Ross, president of the New York, Chicago & St. Louis, who writes that "while we have many things to do on our railroad, and there are many projects under consideration, our program for the next year will depend entirely on business conditions." Likewise, J. M. Kurn, president of the St. Louis-San Francisco, states that capital expenditures for 1931 will, of necessity, depend upon the earnings of that year. L. A. Downs, president of the Illinois Central system, is of the opinion that capital expenditures in 1931 depend upon the material improvement in the financial condition of the road, stating that "capital expenditures in 1930 substantially exceeded the amounts justified by current earning power. That situation cannot be continued indefinitely."

In analyzing the expenditures contemplated during the new year, the first question that arises relates to the primary division of these expenditures between roadway and equipment. In this division there is reflected a change that has been becoming more pronounced during the last decade. Prior to federal control the necessity for increased capacity was a governing factor in the making of budgets, and since capacity could be provided more quickly by the addition of equipment, large portions of the appropriations were devoted to the purchase of cars and locomotives. More recently the necessity for added capacity has given way to that for increased economy, and while there are still greater opportunities for the use of larger and more efficient equipment, the possibilities through roadway improvements loom even larger. As a result, the expenditures have been going more largely to roadway purposes in recent years, as is shown in the following figures:

Year	Total Capital Expendtures	Expenditures for Equipment	Per Cent of Total	Expenditures for Roadway	Per Cent of Total
1923	$1,059,149,426	$681,723,991	64	$377,425,435	36
1924	874,743,228	493,608,460	56	381,134,768	44
1925	784,191,000	338,114,000	45	410,077,000	55
1926	875,000,000	380,000,000	43	495,000,000	57
1927	771,552,000	288,700,000	37	482,852,000	63
1928	676,665,000	224,301,000	33	452,364,000	67
1929	853,721,000	321,306,000	38	532,415,000	62
1930 (First 9 months)	698,821,000	272,825,000	39	425,996,000	61

Increasing Emphasis on Equipment

From the above figures it is seen that the trend towards larger appropriations for roadway improvements was arrested in 1929 and that for the last two years it has again been towards increased appropriations for equipment, rising from a minimum of 33 per cent in 1928 to 39 per cent in the first nine months of 1930. So far as the budgets afford any indication, however, it would appear that this trend will again be reversed in 1931, for, of the appropriations reported, only 22 per cent are allocated to equipment. It is not to be expected that the actual expenditures will decline to this ratio, or that it will even be approached, for, unlike roadway expenditures, many managements hesitate to disclose their plans relative to the purchase of equipment until they actually enter the market and, as a result, the proportion actually spent is almost always larger than a survey of the budgets at the beginning of the year will indicate. It is to be expected, therefore, that the proportion of the total expenditures that will go for equipment in 1931 will more nearly approximate 30 per cent, although it is also to be expected that with more than 525,000 surplus cars and 7,500 surplus locomotives now awaiting use, the expenditures for equipment will be less in 1931 than in 1930.

In analyzing the roadway expenditures contemplated, a number of trends are apparent. In the first place, although it has been a generally accepted fact of late that the days of wide-spread construction of new lines have passed, it is interesting to note that nearly 10 per cent of the total expenditures reported to us as contemplated during 1931 are for extensions. This is borne out by the fact that, as reported on a following page, the Interstate Commerce Commission approved applications, during the year ending October, 1930, for the construction of 1,596 miles of new lines. Among the larger extension programs for which provisions are made in this year's budgets, are 350 miles of new lines in the southwest which the Atchison, Topeka & Santa Fe announced last year, involving a total expenditure of $15,000,000, for which $5,000,000 is set aside for 1931. Also, the Great Northern includes $3,500,000 in its budget for a 97-mile extension, while the Union Pacific proposes to spend $3,000,000 for a 67-mile line.

Another development which is assuming a rapidly increasing proportion of railway funds is grade separation, approximately 12 per cent of the total expenditures reported to us being allotted to this work, or more than for the several hundred miles of new lines in prospect. While projects of this character are particularly numerous in the state of New York, where a comprehensive program of grade elimination is under way, the demands for larger appropriations for this purpose are universal and the expenditures for this character of work will be larger in 1931 than ever before. Indicative of the magnitude of the demands of this character are the following:

Delaware & Hudson	$4,717,500
Reading	3,800,139
Norfolk & Western	3,800,139
Central Railroad of New Jersey	1,000,000
Union Pacific	1,000,000
Great Northern	600,000
Boston & Maine	522,000
Delaware, Lackawanna & Western	500,000
Minneapolis, St. Paul & Sault Ste. Marie	440,000

As in past years, the railways are contemplating relatively small expenditures for additional main tracks, only 4 of the 20 roads that furnished us data reporting improvements of this character, with combined expenditures of less than $1,000,000. It is significant in this connection that the roads are contemplating much more liberal expenditures for automatic signals, centralized dispatching and other signaling facilities to permit the more intensive use of existing tracks. More than half of the roads have items of this character on their budgets, with the total amount more than four times that for additional main tracks.

Likewise relatively limited expenditures are contemplated for freight classification yards, although several large projects are under construction, including the facilities now in process of construction on the Union Pacific at Cheyenne, Wyo., and on the Chicago, Burlington & Quincy at Galesburg, Ill.

That the roads intend to continue strengthening and rebuilding their existing tracks is shown by the fact that those for which we have data have made provision in their budgets not only for the laying of the same mileages of new rail as in 1930, but actually contemplate increasing it by 10 per cent. Liberal expenditures are also in contemplation for ballast, although here the figures are slightly below those for the current year. Considering both rail and ballast, however, our figures indicate that the railways will do at least as much work in strengthening their tracks in 1931 as they did in 1930.

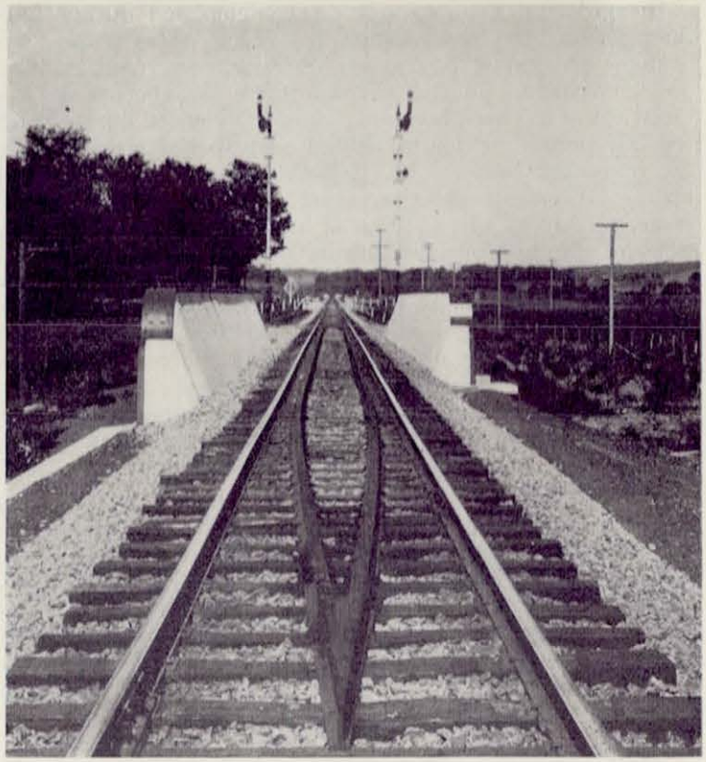
Summary

During the year which has just closed, the railways made greater expenditures for improvements than in any year since 1923. Furthermore, this was the eighth consecutive year in which these expenditures exceeded $675,000,000. As a result, the railways are better prepared today to meet any demands which may reasonably be made upon them than at any time in their history, with reference both to capacity to handle traffic and to condition of equipment and structures. With such a background, the programs which are in contemplation for the new year are more of an expression of confidence in the business stability of the country than of recognition of immediate demands for the facilities. They are also an indication of the appreciation by railway managements of the fact that vast expenditures may yet be made for the improvement of railway property that will yield satisfactory returns in the form of reductions in operating and maintenance expenditures.

The Railways Are Excellently Maintained

No evidence of deterioration in roadway as a result of decreased maintenance expenditures in 1930

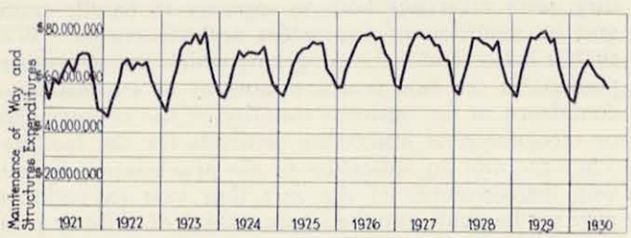
By Walter S. Lacher
Western Engineering Editor, Railway Age



On the Buffalo, Rochester & Pittsburgh

EXPENDITURES for maintenance of way and structures by the Class I Railroads during 1930 totaled approximately $720,000,000. This is a reduction of about $140,000,000 from the expenditure of $862,701,000 in 1929, thus marking the end of an eight-year cycle of increasing outlay for maintenance of way during which the railways carried out the greatest improvement in the physical condition of their properties that has ever been made in their history. There have been periods in the past, as for example in the ten years between 1897 and 1907, when the rate of increase in the outlay for upkeep was greater and more uniform from year to year, but those were periods when the roads were beset with a rapid increase in the mileage of new lines and an enormous growth in the volume of traffic.

In contrast with such past records, the period from 1921 to 1929 inclusive, was one of declining passenger traffic, little growth in freight transportation and limited construction of new lines. For these and other reasons, which will be discussed in following paragraphs, it is obvious that the increase in expenditures for the upkeep of the fixed properties could not continue indefinitely. As a matter of fact, it would appear that the crest was reached in 1926 and 1927, two years when the expenditures by Class I railroads reached almost $880,000,000. The records for 1928 and 1929 indicate a definite tapering off from that maximum, which would no doubt have extended through 1930 even if the volume of traffic during the past year had compared favorably with that of the preceding years. But speculation on that score is futile; maintenance of way expenditures in 1930 declined in sympathy with the decline in earnings.



Expenditures of Class I Railroads for Maintenance of Way and Structures, by Months

The distinctive characteristic of maintenance of way operations during 1930 is the fact that the expenditures reached a maximum in May, which is the first time that the peak occurred earlier than June during the last eleven years. Up to and including May, the expenditures were off only 7.7 per cent compared with those of the corresponding months in 1929. But owing to the steady decline in the outlay for maintenance from $70,758,000, in May, 1930, to $59,209,000 in September, the last month for which statistics are available, the deficiency for the first nine months amounted to 14.4 per cent as compared with the same period of 1929. Expressed in figures, expenditures for the nine months were $656,888,000 in 1929, and $561,981,000 in 1930.

The decline in maintenance of way expenditures is also indicated by the statistics for employment. The largest force in the maintenance of way department was employed in May and totaled 408,042 men, compared with a maximum force of 477,724 men in August, 1929. The minimum force in any one month (up to and including September, 1930) was 331,292 and was but little lower than for any month during 1929.

Properties in Excellent Condition

While these figures do not present a rosy picture, considered from another viewpoint the aspect of maintenance of way and structures is far from a discouraging one. Although maintenance activities were curtailed severely during the year, the fact remains that

the tracks have gone into the winter in excellent condition, and the riding qualities of many of the more important main lines show no evidence of reduced maintenance effort.

There are many good reasons why this should be so, most important among which is the fact that the year of curtailed expenditures came at the end of an eight-

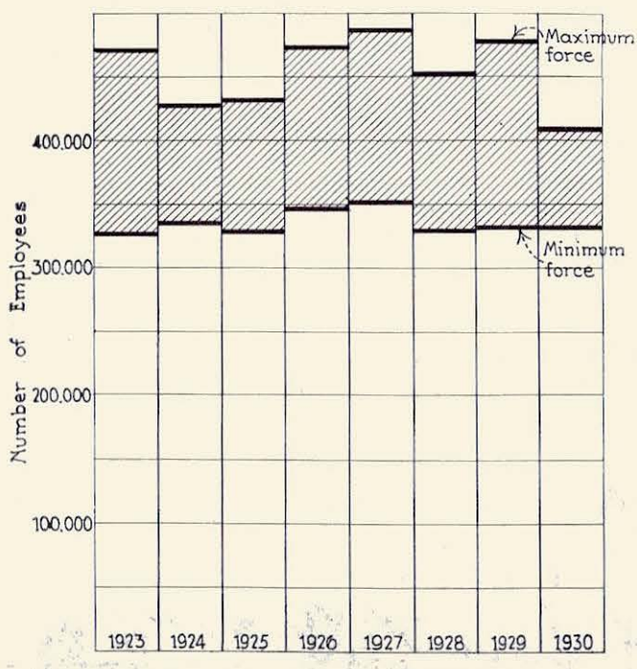
Expenditures for Maintenance of Way and Structures, Class I Railroads

1920	$1,030,504,000	
1921	764,662,000	
1922	736,181,000	
1923	821,913,000	
1924	802,673,000	
1925	824,320,000	
1926	877,877,000	
1927	879,496,000	
1928	845,612,000	
1929	862,701,000	
1930	720,000,000	(three months estimated)

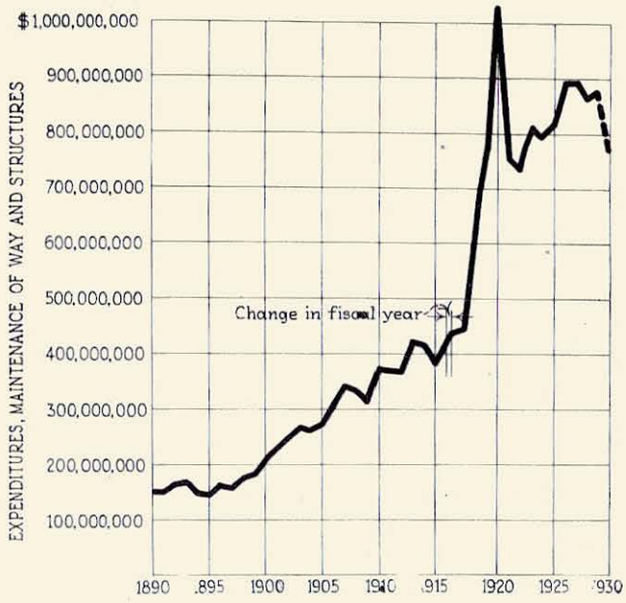
year period of progressive improvement of the track structure. During that period the railways made much progress in programs for increasing the average weight of rails and the use of more and better ballast, and had obtained a status with respect to the use of treated ties and tie plates that was being reflected by a pronounced reduction in the annual tie renewal requirements. Furthermore, the influence of the growing use of labor-saving equipment was undoubtedly becoming manifest in terms of the railway mileage as a whole. Two other factors to be taken into account are the prolonged drought and the decline in traffic, each of which served to reduce the wear and tear on the tracks and roadbed.

Track Structure Being Studied

In passing, it is of interest to record two events of 1930 that served to mark further progress in the strengthening of the track structure. One was the completion by the Pennsylvania of the laying of 130-lb. rail in its main tracks between New York and Chicago, and the other was the announcement by the Kansas City Southern that, based on the results of careful research, it had adopted a plan for making all main-line rail renewals with rails weighing 127 lb. per yard, a weight which is appreciably heavier than that generally provided on lines of equivalent traffic density. The wide-



Range of Employment in Maintenance of Way and Structures Class I Railways



Expenditures for Maintenance of Way and Structures, All Railways, from 1890 to 1930

spread interest which has been displayed in the results of the Kansas City Southern's investigation bespeaks an inquiring state of mind with respect to the track structure on the part of enterprising railway officers. Manifestations of this critical attitude are to be found also in the current development in the use of more rigid fastenings of the rails to the ties and other innovations in track design now being tested on various railways throughout the country.

Progress in Power Tools

The last year was one of continued interest in the adaptation of power tools and their more intensive use. Further progress was made in the modification of gang organizations better to meet the requirements of the effective use of labor-saving equipment. In the main, this embodied the use of larger gangs to the end that their activities may be extended over entire divisions or districts instead of confining them to individual supervisors' subdivisions.

The mechanization of railway maintenance of way work received its initial impetus under the stress of wartime labor shortage, when "labor-saving" rather than lower cost was the prime consideration. But that relationship no longer applies. In the face of an enormous surplus of labor, no device is applied unless it saves money, and the increasing use of many types of power equipment under the careful scrutiny of the results obtained is an effective demonstration of the sound basis upon which this development has been fostered.

Development in power tools during the year was confined largely to the introduction of improved models of equipment already in rather common use. Great activity was witnessed also in earth-moving and hoisting equipment, crawler-mounted machines predominating. A distinctive feature in the field of grading operations is the adaptation to railway maintenance operations of certain types of equipment of a highly specialized character which have previously been employed exclusively by contractors in new construction work.

Other Developments

Continued activity in welding as applied to the building up of battered rails has given rise to refinements such as are evidenced by the introduction of several

new power grinders for the dressing of welded surfaces as well as grinders and cutters designed to chamfer the rail ends as a means of removing fins or retarding their formation. While on the subject of rails, mention may be made also of a new application of the device for detecting internal flaws, one road now employing a modified form of this device in the exploration of relayer rails as they pass through the reconditioning plant.

The severe winter of 1929-30 gave new impetus to the use of devices for melting snow and ice in and around switches and other trackwork. While the greatest advance in this direction has been observed in large installations of fixed devices, fired by gas or oil, there has also been further development in car-mounted melters and hand torches.

While 1930 was definitely a year of decreased expenditure, there was no evidence of a lessening of the enterprise and initiative which have characterized the work of this department during the last decade. A rather unusual manifestation of the growing appreciation of the importance of refinements in maintenance of way practices is one that is now being observed with greater frequency entirely outside of the maintenance of way department, namely, in the work of the forces engaged in roadway construction. Here, a number of railways are now introducing refinements in the methods of forming embankments and excavating cuts and in measures to insure adequate drainage, which, while resulting in some increase in first cost, will do much to shorten the time required to produce thoroughly solidified roadbeds after new lines are placed in operation.

Future in Our Own Hands

(*Continued from page 23*)

1929. Liquidation has been heavy ever since—18 months of distended commercial failures. If a new high mark in a year's peak car-loadings should not come in October, 1931, the recovery would not be repeating history but would be three months overdue. If next fall's business is to reach a new high the railway managers will sense this considerably in advance and widen their activity to meet it. We may picture the contrast between the recovery when it comes and our experience at and following the autumn of 1929. The peak melted while we were climbing it. The highest week of the year in car-loadings never got into October at all but was the week ended September 28. We were looking forward to the descent. At the next new high we shall be looking forward to the long ascent of successive new summits. Instead of going down and out we shall go up and on.

An improvement in railway credit might precede a traffic upturn. It is believed in Wall Street that the purpose to "fight" proclaimed by Vice-president Elisha Lee of the Pennsylvania at the Railway Business Association dinner November 19 and the next day by the Association of Railway Executives has been a factor in moderating the decline in railway security prices. That is sentimental. Sentimental likewise will be the effect as "fighting" takes the form of a well-defined and well-developed efforts for relief from burdens and dangers imposed upon the railways by circumstances beyond their control. All the world loves a fight. The demand for redress from inequities under the head of taxes and of pampered competitors stirs the blood. It enlists, as it should, the enthusiastic support of those concerned by business or other ties in working out a more wholesome condition for the railways. All of us must lend a hand. That a great many people, mostly organized, want to help the railroads and are evidently eager to exert themselves for it is a bull argument among investors. There is reason to think some of these problems will soon be made to look to investors as if on the way to solution.

Prosaic, But Well Worth While

But there is another side. Life is not all fighting. There are dull, dreary tasks. Though all the world loves a fight, only a small number embrace drudgery. Chores that involve drudgery, much of it not even in the trenches but back in barracks, constitute problems the neglect of which will make futile the solution of the important questions already mentioned. I need cite only the foremost—the organization of railway revenue control in the routine adjustment of freight rates: a cause that offers no fighting to the knights who enlist in it but on the contrary contemplates harmony and diplomacy; union among the railways themselves and working cooperation between the railways and the shippers. It is going to be prosaic compared with heaving a half-brick at the Interstate Commerce Commission, but dull and dreary though it prove, it is the cause by supporting which railway supply manufacturers can do more than in any other way to reinvigorate railway credit. Only with the encouragement of promised cooperation by business men can the railways undertake to establish control of revenue. By according such support members of our guild can increase the power and confidence of the railways to spend the money which they have authorized but not appropriated, and to expand immeasurably both authorization and appropriations. Our future is largely in our own hands.

* * * *

A New York Central 4-8-2 Type Freight Locomotive Leaving the East Buffalo Yards, Buffalo, N. Y.

Progress in Locomotive Design Ahead of Utilization

Developments of past years ready to contribute to further operating economy

By C. B. Peck

Mechanical Department Editor, Railway Age

THE past year has not been one in which to look for the development of many striking innovations in motive power and rolling stock. The conditions which have prevailed during most of the year on a large part of the railway mileage in America have not been conducive to much interest in innovations of any kind.

Developments in Passenger and Freight Cars

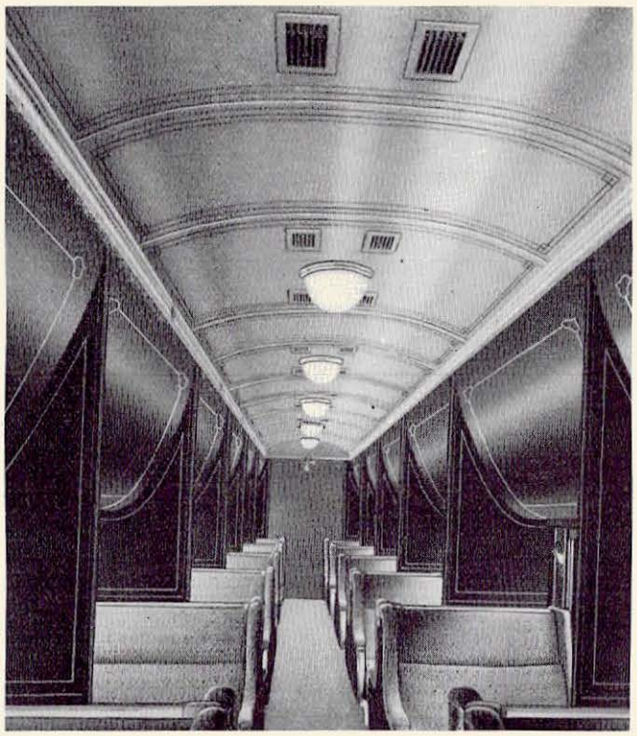
Nevertheless, two noteworthy events have occurred during the year in the equipment field. One is the application of air-conditioning equipment to passenger-train cars. The Baltimore & Ohio and the Atchison, Topeka & Santa Fe each placed in service during the past summer a dining car equipped to cool and control the humidity of the inside air and Pullman has been developing a similar system for use in sleeping cars. An installation of air-conditioning equipment to at least one sleeping car was completed before the end of the year.

This development is entirely in keeping with the trend which has been noted for several years past toward an increase in measures for the improvement of the comfort and pleasure of the traveling public. Not only is it the most marked step taken in many years in its effect on the comfort of high-class long distance passenger travel over a large part of the United States during the seasons of heavy tourist travel, but it is likely to have far-reaching effects on passenger-car design as well as on the development and use of electric power for various auxiliary purposes in addition to electric train lighting. As was the case in the development of passenger cars of all-steel construction, there can be no retracing of steps once this movement is well started. The popularity of cars or trains supplied with conditioned air will force a steady increase in the installation of air-conditioning systems.

The other noteworthy innovation to which reference has been made is the installation of trucks equipped with roller bearings on 100 Pennsylvania hopper cars. These cars are providing the first extensive service trial of roller-bearing equipment in freight service in North America.

The Locomotive

Although the past year has not produced any new developments of major character in the steam locomotive, it cannot be said that opportunities for increases in the efficiency of railway operation offered by locomotive improvements have for the time being been exhausted. No locomotive built prior to, say, 1925 possesses all of the capacity- and economy-increasing factors, which have been built into an increasing proportion of the locomotives acquired by the railroads since that time. The particular factors which mark 1925 as the birth of what may be considered, for the present, at least, as the modern



Interior of Pullman Sleeping Car "Jacksonville" Equipped for Air Conditioning

locomotive are higher boiler capacity and efficiency, and more miles between shoppings than were built into locomotives before that time. The large grate area, made possible by the four-wheel trailer truck has effected a marked improvement in combustion efficiency. The Type E superheater has contributed to an increase in heat transfer capacity within given size limits; the cast-steel locomotive bed, with integral cylinders, by eliminating a large number of heavily stressed bolted joints, has paved the way for marked reductions in the cost of locomotive repairs. The articulated main rod has also contributed to reduced machinery repairs.

Improvements in Practices, 1920 to 1925

The marked improvements in operating efficiency and economy which have taken place since 1920 have been the subject of frequent comment and a source of much satisfaction to the managements of American railways. From 1920 to 1925 the average freight train load of the Class I railroads of the United States increased 15.8 per cent, and the direct costs per thousand gross ton-miles decreased approximately 35 per cent.

This was a period during which marked changes in operating and shop practices were taking place. Much of the improvement in train-operating cost can be accounted for by better control of fuel utilization, a marked reduction in fuel prices, improvements in yard and roadway facilities which reduced train delays and crew overtime, increases in the length of locomotive runs, improvements in enginehouse practice, and marked improvements in back-shop efficiency. This is evident from the fact that a 13.6 per cent reduction in train-miles due to increased train load was accompanied by a reduction in unit costs of over 40 per cent in fuel, better than 25 per cent in crew wages, about 40 per cent in enginehouse expense, and more than 30 per cent in locomotive repairs. Only 14 or 15 per cent of all freight locomotives were purchased new during this period, an average of less than three per cent a year. The 20 per cent increase in the tractive force of the average freight locomotive was as much the reflection of the small units scrapped as of the large units added. It is evident that improvements in locomotive design were, to say the least, minor factors in the more than one-third reduction in average ton-mile costs during this period.

What Happened, 1925 to 1929

Now, consider the period from 1925 to 1929, inclusive. On the Class I railroads the average train load increased 11.4 per cent. This increase is equivalent to a reduction in train-miles of 10.4 per cent. Unit fuel consumption, in pounds, decreased 7.7 per cent, and crew wages closely in proportion to the reduction in train-miles. Enginehouse expense and locomotive repairs each were reduced by about 20 per cent.

During this five-year period something over 2,500 new locomotives were purchased for freight service by the Class I railroads, amounting to not more than 9 per cent of the freight locomotives in service at the end of the period—less than 2 per cent per year. The tractive force of the average freight locomotive increased but 6 per cent.

Assume that these new locomotives handled about twice as much of the business as the average for all locomotives (which agrees well with the facts in several cases), or, say, 18 per cent of the total gross ton-miles. Modern locomotives of the kind extensively built within the last five years have demonstrated their ability under a wide variety of conditions to effect an average reduction in unit fuel consumption of 30 to 40 per cent as compared with locomotives designed but a few years earlier. These locomotives, assuming that all were equal to the best, might have effected a reduction in the general average coal rate per thousand gross ton-miles of about 6 per cent. As the unit fuel consumption decreased by nearly 8 per cent and not all freight locomotives built during this period were equal to the best, it is evident that improved design must share the credit for a considerable portion of the fuel saving with other factors, such as further reductions in delays, better train loading and better firing practice. Similarly, more systematic attention to running repairs, fewer turns and more efficient back-shop organization were major factors in the reduction in the unit costs of enginehouse expense and locomotive repairs.

These considerations indicate that the contribution of modern locomotives to improvements in operating economy lie largely in the future, considering the railroads as a whole. Comparing the relative improvements in operating costs effected during the two periods since 1920, a marked slowing up in the rate at which some of these reductions in expense are taking place is quite evident. This, in a general way, supports the belief that the major opportunities for improvements in operating and maintenance practices are gradually being exhausted. To the extent that this is true it then becomes evident that more dependence will have to be placed on the contributions of modern locomotives in the future in order that reductions in the direct costs of operation may continue to be made without interruption.

The close of the war marked the beginning of a new epoch in the railway industry in America. Prior to 1918 the net ton-miles of revenue freight traffic increased steadily at an average rate which caused the volume to double every twelve years. Had this trend continued, instead of an annual volume of between 450 and 500 billion revenue ton-miles, the railroads would have had to move over 750 billion ton-miles last year. This striking change in trend requires an entire change in approach to the problem of equipment renewals. During the period when traffic volume was multiplying rapidly the purchase of new locomotives required to handle the increasing volume of business served to keep the character of the motive power in service fairly well in step with the progress in locomotive design. The constantly increasing tractive capacity of the new freight power was a source of a steady and marked decrease in operating expenses through the reduction in train-miles.

Today the situation is entirely changed. There is now no need for more locomotives, but for fewer and more efficient locomotives. Opportunities for reducing expense through increases in train load are still available, as is evident from the steadily increasing average train load from year to year. But these opportunities can only be attained by a policy, new to the railroads, of liberal retirements and replacements in which the possibilities for increasing gross revenue play little part as compared with possibilities for a continued decrease in operating expenses.

What Modern Locomotives Can Do

Modern locomotives have demonstrated their ability to effect decreases in fuel consumption much greater in proportion than those normally effected by increases in train load. It is not too much to expect reductions in maintenance as the result of improved mechanical construction of as much as one-fourth to one-third, measured on a gross ton-mile basis. As little crew overtime remains to be saved, reductions in crew wages will be in proportion to reduced train mileage where train loads can be increased.

From such data as are available, the best modern freight locomotives under intensive utilization may be expected to earn a net return on the investment ranging from 10 to 20 per cent, contributed largely from repairs, fuel, and crew wages.

A 120 million dollar annual investment in freight locomotives alone, providing 6,000 new locomotives in five years, would in that time effect a reduction in the average ton-mile cost of the freight movement in the United States of between 7 and 14 per cent, and with this saving in average costs would go an increase in train speed, the advantages of which, to the railroads and to the country, it would be difficult to evaluate.

The purchase of locomotives is no longer a matter of acquiring a maximum of hauling capacity with which to increase gross revenue, but one of keeping the locomotive ownership in step with the progress in locomotive efficiency and power capacity to meet the demand of a service relatively fixed in volume but changing in its requirements.

Progress in the art has by no means come to a standstill. Who can say what new opportunities for economy the utilization of higher pressures and special materials may offer in the modern locomotive of five years hence?

The New Bridge Over the Schuylkill River and the Thirtieth Street Pennsylvania Suburban Station, which will Eventually be a Part of the Philadelphia Station to be Located at the Left

Roads Continue to Push Electrification Programs

There has been no cessation of activities in the electric traction field and some additional mileage has been authorized

By Alfred G. Oehler

Electrical Department Editor, Railway Age

THE close of 1930 finds the Cleveland Union Terminal electrification completed and in operation. The Delaware, Lackawanna & Western installation is practically complete and a part has been in operation since September 3, 1930. The Reading will start electric operation in June, 1931, and has extended its authorization to include two branches. Electric operation on the Pennsylvania has been extended over 50 additional miles of route thus including operation of all suburban and local passenger trains on the Philadelphia district, and work on the remainder of the extensive program is proceeding according to schedule. The consummation in the near future of the West Side electric system of the New York Central will complete the electrification of all lines in New York City.

Cleveland Union Terminal

The Cleveland Union Terminal electrification, placed in service June 28, 1930, is the first project of its kind in the United States where tunnel operation is not involved that provides for the hauling of main line passenger trains through a large city with a transfer to steam power at each end of the electrified section. The electrified territory extends over 17 miles of route between terminals established at Collinwood, on the New York Central, 10.75 miles east of the Cleveland station, and Linndale, 6.35 miles west of the station on the Big Four. Nickle Plate trains are hauled over a five-mile section of the electrified line.

The electrified territory embraces about 60 miles of track and requires the services of twenty-two 204-ton electric locomotives receiving 3000-volt, direct-current energy from an overhead contact system.

The 11,000-volt, 3-phase, 60-cycle power purchased from the Cleveland Electric Illuminating Company is converted to 3000-volt, direct-current power in two substations by means of motor-generator sets. All machine and direct-current feeder breakers and sectionalizing breakers are of the high-speed type. Each substation is remotely controlled from a power supervisor's office

located centrally in the terminal station building.

A feature of the installation is the system of dead-section sectionalizing that is used. It makes impossible the accidental energizing of a dead portion of the line by the passing of one or even two locomotives with all pantographs raised.

Delaware, Lackawanna & Western

The Lackawanna suburban electrification, announced in April, 1928, is now nearing completion and when completed will include approximately 70 route miles and 160 miles of track. The delivery of the motor car and trailer units was started in July, 1930, at which time a section of the overhead lines then completed was energized and the training of crews begun.

Electric service was inaugurated between Hoboken, N. J., and Montclair, N. J., a distance of 13 miles, on September 3, 1930, and complete electric operation of this branch, involving the operation of 75 trains on week days, was effected on September 7. Electric service between Hoboken and South Orange, N. J., (14 miles) was started on September 22, 1930 and completed on September 28. This service employs 55 trains on week days. Electric operation between Hoboken and Morristown, N. J., was started on December 18, and complete electric operation, including the lines to Gladstone, N. J., and Dover, N. J., will probably be effected in January, 1931.

Four substations and five tie stations are now in service and the remaining substation is substantially complete, but will not be placed in operation until needed. All of the 141 units, each consisting of one motor car and one trailer semi-permanently coupled together have been delivered. The motor cars are new equipment and the trailers are steam cars which have been equipped with vestibules, electric heaters and control equipment.

The electric operation includes two locomotives which have been delivered and are used for switching and transfer service between the Secaucus and Jersey City freight yards. These are three-power locomotives which operate from the overhead contact system, but which may also operate independently on non-electrified tracks by means of an oil-engine-driven generator and storage battery.

This electric traction installation is the first in this country to employ 3000-volt, direct-current, multiple-unit cars and it is the first time such equipment has been used anywhere in the world on a large scale.

The traction motors are self ventilating with cooling air taken through louvres at the top of the car.

The cars are equipped with line breakers and high-speed short circuit protection is afforded by an improved type of high speed circuit breaker used in the substations and tie stations. The breakers are backed-up by a new type of expulsion-compression fuse on the motor cars. Heaters operating on the 3000-volt circuit were designed for these cars as were also pantographs made with four, self-alining roller bearings.

Another innovation is the exclusive use of mercury-arc rectifiers in the substations for converting the purchased alternating current power to direct current for the contact system. These rectifiers are used in sizes up to 3000 kw., are provided with excited anode grids, and are inherently self-regulating; the direct current voltage on the rectifier rises with increase of load and thus compensates for line drop.

New York Central

In compliance with the law and in accordance with the New York Central's agreement with the City of New York, the railroad is proceeding with the electrification of its west side tracks as far south as Seventy-Second street. The law requires that electrification to this point be completed by July 1, 1931, and the railroad will meet this requirement. Forty-two electric locomotives for road freight purposes have been ordered and will be delivered in the early part of the year.

From Seventy-Second street to St. John's Park the railroad proposes to operate with oil-electric locomotives which, the Public Service Commission has ruled, will comply with its requirements for electrification. The railroad has ordered 35 of these locomotives, some of which have already been delivered.

Pennsylvania

On June 29, 1930, the Pennsylvania inaugurated electric operation of all suburban and local passenger trains between Philadelphia, Pa., and Trenton, N. J., a distance of about 33 miles. Electric operation was extended on July 20, to include suburban and local passenger trains on the Schuylkill division from Philadelphia, Pa., to Norristown, Pa., 17 miles.

On September 28, a fully electrified underground suburban passenger terminal was placed in service in the business center of Philadelphia. It is located beneath and extends north of the present Broad street terminal. Linked with this a new suburban station at Thirteenth street on the west bank of the Schuylkill river was placed in service. This suburban station will eventually be a part of the new Pennsylvania, Philadelphia station. The electrification now includes all suburban service in the city of Philadelphia and the present facilities open the way for the electric operation of all passenger trains through Philadelphia when the new station is completed. The Pennsylvania now has in operation 354 miles of electrified line and 683 miles of electrified track, of which 131 miles of line and 426 miles of track are in the Philadelphia suburban zone.

The remainder of the electrification program, which includes lines from New York, N. Y., to Washington, D. C., and from Trenton, N. J., to Columbia, Pa., is proceeding according to schedule. Work has been in progress for several months between New Brunswick, N. J., and Sunnyside Yards in New York City and at present the construction of the 11,000-volt overhead contact system between Sunnyside Yards and Manhattan Transfer, N. J., is proceeding rapidly.

Four new types of electric locomotives have been received and are being tried out between Trenton, N. J., and Paoli, Pa.

Reading

The original Reading electrification program as announced in December 1922 is proceeding according to schedule and is due to be finished before July 1, 1931. Decision to extend the electrified territory to include the Doylestown branch, running about 10 miles north and east from Lansdale, Pa., was reached in May, 1930. In November it was announced that another extension would be made from Langhorne, Pa., to West Trenton, N. J., 8.9 miles. The two extensions are due to be completed before the end of 1931. The original program included 120 track miles and 50 route miles. The new total includes 161 track miles and 69 route miles.

Catenary construction work is now about 70 per cent completed. It is about finished between Philadelphia, Pa., and Lansdale, Pa., overhead bridges are installed to Langhorne, Pa., and to Hatboro, Pa., and wire is being strung on these branches. The extensions authorized this year are now provided with bridge

foundations and the erection of steel has been started.

The Wayne Junction substation and the load dispatcher's headquarters including supervisory control system are about 50 per cent completed. Work is in progress on nine other switching and substations. The supervisory control system will be the most comprehensive installed up to this time and will place under the control of a load dispatcher about 250 circuit breakers and motor-operated switches at 26 locations.

A contract for electric power to be obtained from the Philadelphia Electric Company was signed on January 9, 1930, and power is to be delivered for testing and the training of crews on May 1, 1931.

A total of seventy, 12,000-volt, multiple-unit cars, including 61 passenger cars, seven passenger and baggage cars and two passenger, baggage and mail cars were ordered in March, 1930. Delivery of these cars will begin in January, 1931. An unusual feature of these cars is the 12,000-volt bus and connectors between cars mounted on the car roofs. This permits the operation of trains of any desired length with only two pantographs raised.

Another innovation is the arrangement permitting the Philadelphia Electric Company to run a power line overhead on the railroad right-of-way. The power company, faced with the great difficulty of extending a power line underground from a point outside into the heart of the city of Philadelphia, made arrangements for running this line on steel overhead structures spanning the tracks of the railroad. The railroad received for this consideration: The control and co-ordination of the physical and inductive conflict which might arise were the electric company's lines to be located off the right-of-way, but parallel to it; supports for its transmission and catenary circuits; the alteration of signal and telegraph facilities to render any inductive interference unaffective (this included the changing of the signal system from direct to alternating current); an annual rental charge for the occupation of the right-of-way.

All of the railroad electrification work, including the placing of concrete foundations, erection of steel, stringing of catenary and transmission systems, installation of substations and supervisory control equipment and underground duct lines is being done by railroad forces under the direction of the electric traction engineering department.

Great Northern

The Great Northern has placed in service four new motor-generator type locomotives essentially the same as the 1—C+C—1 type locomotives placed in service in 1927. Each locomotive has a total weight of 259 tons with 205 tons on drivers and has a one-hour rating of 3,300 hp. Power for operation is received from an 11,000 volt single phase, alternating current overhead wire and converted on the locomotive by a motor-generator set to direct current at 750 volts for the operation of the traction motors.

Illinois Central

Four 100-ton, direct-current locomotives were placed in service by the Illinois Central for switching and transfer service in the Chicago suburban electrification. Each unit is capable of handling maximum train cuts of 2,000 tons. The locomotives will develop a tractive force of 31,000 lb. at 17.7 miles an hour at the one-hour rating, and have a starting tractive force at 30 per cent adhesion of 60,000 lb. A feature of these units is the means provided to compensate for weight transfer. This is done by varying the field strength of the traction motors. The field connections are controlled by a push button and by the use of this arrangement the starting tractive force was increased by 16.6 per cent.

Long Island

Eighty-five multiple-unit cars are being equipped for service on the Long Island. Forty-five of these are new cars and 40 will be converted steam train cars. To provide the power requirements made necessary by the addition of these cars, the railroad is remodeling one substation, is erecting four new substations and is planning to build four more new substations next year. The remodeled substation, now about completed, is located at Floral Park, L. I. It contains two 3000-kw. mercury-arc rectifiers and will replace two 1500-kw. portable substations. New substations will be constructed at Hempstead, Manhasset, and Rockaway Park, L. I., each equipped with one 3000-kw. rectifier unit. At Goose Creek, L. I., a siding will be built and also a shed to house the portable substation cars, together with high-tension alternating current and low-tension direct-current switching equipment. It is expected that the four new substations will be placed in service during January and February, 1931. The locations of the four additional stations, which will each contain one 3000-kw. rectifier have not yet been determined.

New York, New Haven & Hartford

Early in 1930, the New Haven placed in service three electric multiple-unit motor cars of an improved type together with nine trailer cars. The improved type motors have a one-hour rating of 260 hp. Compared with previous designs these motors provide a considerable increase in horsepower with relatively little increase in weight. Each motor car has a one-hour rating of 1040 hp. and can be used to haul three trailers. Like the other New Haven cars, these operate on alternating current from an overhead wire and also on direct current from a third rail at 650 volts. In July, 1930, an order was placed for 12 more motor cars and 21 trailers.

In September, 1930, the New Haven ordered 10 new electric passenger locomotives which will be ready for delivery about June, 1931. They will have a total weight of 200 tons with 135 tons on drivers and each will be equipped with six twin motors totalling 3,600 hp. They will be used on 11,000 volts alternating current and 650 volts direct current for main line service on the New Haven and in and out of the Grand Central Terminal in New York City. They may later be used to operate into the Pennsylvania Station in New York City via the Hell Gate Bridge route.

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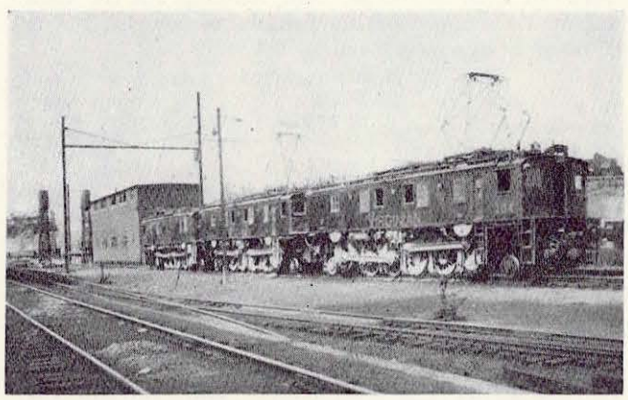
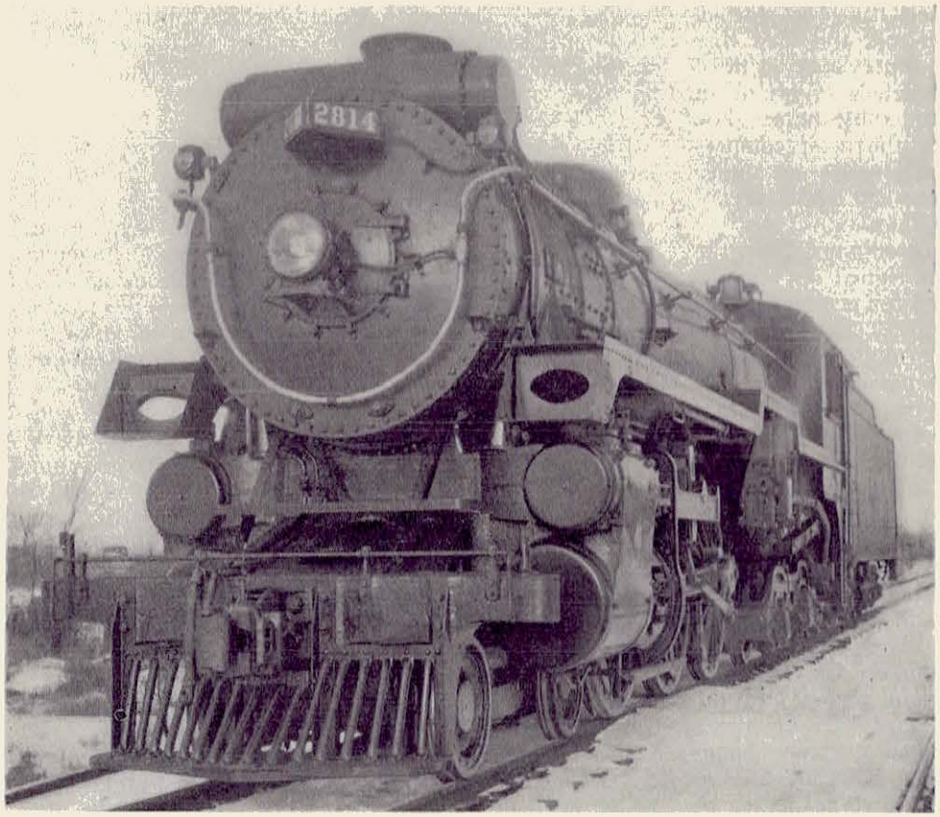


A Heavy Electric Locomotive at the Virginian's Roanoke, Va., Terminal



New C. P. R. 4-6-4 Type Locomotive, Equipped with Roller Bearings

Canadian Lines Expect Upturn

Believe 1931 will bring improved traffic—Depression less marked than in U. S.—Expansion continues

By J. G. Lyne

Financial Editor, Railway Age

THE Canadian railways have journeyed longer in the vale of depression than have the lines south of the international boundary. Traffic declines hit the Canadian railways not alone in 1930, but in 1929 as well. Taking the revenue car loadings for the first 49 weeks of 1926 as 100 per cent, loadings for the same period of 1929 and 1930 in Canada as compared with the United States have been as follows:

	Revenue Freight Cars Loaded, 49 Weeks	
	Canada % of 1926	United States % of 1926
1926	100.00	100.00
1927	103.98	97.25
1928	113.76	96.85
1929	108.97	99.55
1930	97.40	86.65

Thus it is that in Canada cumulative totals of loadings for the first 49 weeks of the current year are 11 per cent less than the loadings of the same period in 1929, whereas in the United States the percentage of decline has been 13. The rate of decline in Canada likewise seems to have slowed down. The total for the forty-ninth week of 1930 was but 8½ per cent lower than the total for the same week in 1929, whereas in the United States the loss compared with the same week in 1929 was more than 15 per cent.

Gross earnings of the Canadian National for the first ten months of 1930 totaled $189,274,118, a decline of 14.2 per cent from the same period of 1929. Operating expenses totaled $165,655,167 a decline of 8.2 per cent. Net operating revenues for the period were $23,618,950—a decrease of 41.2 per cent. The Canadian Pacific in the first ten months had gross revenues of $149,795,223, operating expenses of $120,629,697 and operating net of $29,165,526, the percentage of decline in the three totals being respectively 15.9, 15.4 and 17.7, when compared with the first ten months of 1929.

Executives Express Cautious Optimism

The presidents of the two leading railways of the Dominion look forward to 1931 with guarded optimism. Speaking in Chicago early in December, President E. W. Beatty of the Canadian Pacific said:

"I look for a rather light spring traffic on our road to be followed by a gradual improvement because of the better Canadian industrial situation. Our tariff, I believe, has stimulated some industries and helped the

unemployment situation somewhat, although the results are not so conspicuous as they would be with a larger population. We are of the opinion, nevertheless, that Canadian industrial development will go hand in hand with development of natural resources.

"There is a good deal better feeling in Canada where we were relatively less involved in stock speculation, whose aftermath has therefore had a less depressing psychological effect than in this country.

"We are having an open fall and our railway net for November and December will show an increase over last year's figures. Our expense ratios are all right. Taking railway and special income together we will cover our dividend requirements for the year, though with only a small surplus.

"A low wheat price in Canada, of course, affects us at both ends—in the agricultural west and the industrial east. Since the end of our crop year our exports of wheat have run well ahead of the corresponding period a year ago."

Gross earnings in 1930 of the Canadian National will be $40,000,000 less than in 1929, but drastic economies in all departments of operation and in capital expenditures will offset this to the extent of about $30,000,000, said Sir Henry Thornton, president of the system, in a recent interview.

Sir Henry estimated that at least 50 per cent of the drop in gross earnings was due to the sluggish movement of wheat this year and the remainder to the falling off in general business due to world wide economic depression.

Will New Government Change Policy Toward C. N. R.?

The large savings effected, he indicated, were largely achieved by putting off construction work and other new operations not immediately essential. He added that the economies were not working hardship on anyone or resulting in undermaintenance of the railway.

Canada had a general election in July which resulted in a victory for the Conservative party and the unseating o fthe Liberal government which has held swy in Ottawa continuously since 1921, with the exception of a brief period in 1926. It has been under the rule of this party that the Canadian National was organized and given its present form. Following the general election there was considerable speculation as to whether the change in the government would bring any alteration of policy regarding the conduct of the publicly-owned railway. After the question had been discussed in some detail in the press, the Conservative Minister of Railways, the Hon. Robert J. Manion, denied that the government would in any way play favorites as between the two great railway systems. Continuing, he said in part:

"Our Government realizes too well the immense importance of our two great railway systems to countenance any such foolish conflict. Fair treatment will be given by us to the great National system, but I am sure no Canadian citizen would wish unfair treatment meted out to that other great institution, the Canadian Pacific. Our aim will be greater co-operation and less duplication.

"Mr. Beatty has recently said that the Canadian Pacific is not in politics. Sir Henry Thornton has also stated that there is no politics on the Canadian National. In other words, there is no politics in either railway, and neither railway is in politics. That is as it should be. Our Government does not desire to inject politics into our relations with either of the great railway systems, and I am sure that neither of the great railway systems aspires to control the policies of the Government.

"That does not mean that we will accept blindly and without question proposals involving tens of millions of railway expenditure. Before the Government will ask Parliament to provide railway appropriations, the

The Recently Enlarged and Improved Chateau Laurier, owned by the C. N. R., at Ottawa

Government will require to be satisfied as to the wisdom and the necessity of proposed expenditures. We believe it to be the Government's duty as trustee for the people of Canada—indeed, as trustee of the Canadian National itself—to avoid unwise or unnecessary increase in already heavy capitalization and interest charges.

"To my mind, the real friends of the National system are not those who loudly cry, Hands off the Canadian National, but those who are anxious to see that railway in a position not only to provide interest charges —to the public, at least—but as soon as possible in a position to take care of all financing needed without either cash subsidies or guarantees from the Government of Canada. In other words, we are most anxious that the Canadian National shall work to improve its own credit position."

Prospect of Refinancing

The last statement is significant in view of the plan for reorganizing the finances of the National system which has been under study and discussion for some years past. The capital structure of the system is badly out of line with its earning power, and tends to become more so each year as the company is charged with interest which it fails to earn on obligations held by the Dominion government. The purpose of financial reorganization would be to write off those obligations which represent development costs, back interest and other charges upon which the company cannot hope to pay a return, and give it a capital structure in line with its present value. Such a procedure would put the financial results shown by the company on the same basis as those of an ordinary private concern and not on that of an insolvent corporation. It would permit the railway to raise funds on its own credit, instead of involving the Dominion government as guarantor, which will be necessary as long as insolvency is permitted to continue. The task is one of great difficulty, however, since the problem is not only intrinsically difficult but it must be solved in a manner to work no injustice either on the management of the National system or the Canadian Pacific.

Dr. Manion on December 26 announced a reorganization of the board of directors of the National system in which all the appointees of the former government, except four (two officers of the railway, the Deputy Minister of Railways and the president of the Canadian Trade and Labor Congress) were dropped. The directors, members of the former board, who are retained are: Sir Henry W. Thornton, chairman and president of the railway; Gerard Ruel, vice-president (law); Deputy Minister of Railways V. I. Smart; and Tom Moore, president of the Trade and Labor Congress. Other directors represent seven of the provinces of the Dominion. Dr. Manion announced that the government intended at the next session of Parliament to bring down legislation to permit representation of all the provinces on the board.

New Terminal for Montreal

The most important construction project undertaken in the Dominion during the past year was the beginning made on the new terminal of the Canadian National in Montreal, which when completed will rank among the largest of such structures on the continent. The Temiskaming & Northern Ontario, a line owned by the Ontario government, continues its construction progress northward, with completion of the project to tidewater on James Bay in sight for the early future. The Hudson Bay Railway has been completed, after a fashion, but is not yet able to handle regular traffic. There is no necessity for this as yet, however, since port and other facilities at Churchill, the terminal, are not yet completed. The outcome of this venture will be watched with a great deal of interest. It will shorten the haul on Western wheat to Europe; there is no question of that. But will the Hudson Bay route be sufficiently free of ice during a long enough period each year to permit the economical operation of shipping? Whether the hope of having a busy tidewater terminal at Churchill ever develops or not, however, it is altogether likely that eventually mineral and other resources will be developed to build up traffic on the line.

New 4-6-4 Passenger Locomotives

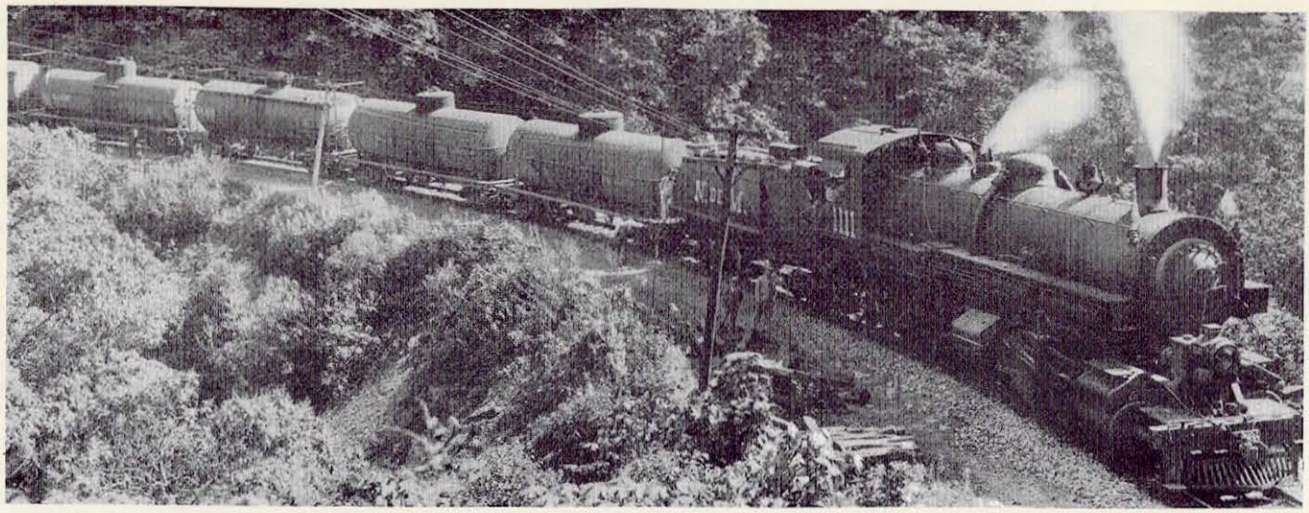
Construction of new mileage during the year was largely restricted to branch lines in Alberta and Saskatchewan, with the exception of the work done on the Temiskaming's line to James Bay, noted above. New mileage completed totaled 385, about half that of the preceding year—a figure which, however, may be compared with 513 for the entire United States. The Canadian National built new stations at Halifax and Hamilton (the latter not yet completed) and either started or completed hotels at Halifax, Charlottetown, Saskatoon, and Vancouver, and completed a large addition to the Chateau Laurier at Ottawa. The Canadian Pacific constructed a hotel and a group of cottages at Yarmouth, N.S., a new hotel at Kentville, N.S., and extended its hotel facilities at Toronto and Winnipeg. Terminal improvements at Quebec and Toronto were begun. Both railways made great progress in improving their already excellent passenger service during the year.

Orders for locomotives for service in Canada during 1930 totaled 95, as compared with 77 in the preceding year. Of the total 51 were ordered by the Canadian National and 20 by the Canadian Pacific. Notable among these orders were 15 powerful passenger locomotives of the 4-6-4 type. Freight car orders totaled 1225 for the Canadian Pacific and 781 for the Canadian National. The latter company placed orders for 34 and the C. P. R. for 167 passenger train cars. Of the Canadian Pacific's large purchases 77 were sleeping cars.

Competitive Methods of Transport

The Canadian railways have not lost traffic to the highways to the same extent as have the United States lines. On the other hand it is in the sections where development has been greatest and, consequently, where traffic is most profitable where most highway development has taken place. In the sections of thin traffic, of which there are still many in Canada, there are few highly developed highways. It is significant certainly that to open up new territories, which Canada is constantly doing, it is always railways rather than highways which the developers first demand. Furthermore, the Canadian winter is not conducive to the development of dependable year-round long distance commercial highway traffic.

Recent months have, apparently, seen some progress in Canadian interest in the development of a St. Lawrence deep waterway, but there are many problems of disposition of waterpower rights and the like to be worked out before complete agreement with the United States on this project can be reached. On the other hand, the realization of even a portion of the hopes held out for the development of the Hudson Bay route might alter western sentiment considerably. In any event, the Canadian railways certainly have no more to fear from competing methods of transport than have the American railways; and quite probably they may have a great deal less.



A Mallet Freight Locomotive on the National of Mexico Climbing a Four Per Cent Grade Between Tamasopo and Cardenas

Mexican Lines Build for Future

Reorganization of National Railways shows marked progress —Santa Fe completes new link with Mexico

By Richard W. Beckman

Associate Editor, Railway Age

THE outstanding railway development in Mexico during 1930 was the agreement reached with the International Committee of Bankers by the Mexican minister of finance, Luis Montes de Oca, for refunding of the debt of the government railways, the system of lines operated as the National of Mexico. The importance of this agreement is apparent when it is noted that the National Railways, with 8,500 miles of line, comprise about 70 per cent of the railway mileage in Mexico. The other important lines in Mexico are the Southern Pacific of Mexico, with 1,370 miles, the Mexican, with 486 miles, and the Mexico North-Western and the Kansas City, Mexico & Orient of Mexico, operated as one system with 845 miles.

Refunding Chosen Instead of Foreclosure

The agreement was signed at New York on July 25, after five weeks of negotiation, by Thomas W. Lamont, as chairman of the International committee, and Senor Montes de Oca for Mexico. The arrangement is a part of the general agreement for the refunding of the Mexican debt. The portion affecting the National Railways is based upon the capacity to pay, and provides in effect for the refunding of virtually the entire principal of the debts, with a drastic reduction of the amounts due for accrued arrears of interest. While the status of the Railways, at present, may be considered one of insolvency, it was nevertheless deemed advisable to avoid bankruptcy proceedings and accept instead a plan of reorganization proposed by the Mexican government.

The entire existing debt is to be consolidated in a new issue, secured by a general mortgage to bear interest after a certain interval at 5 per cent per year and payable in 45 years. The holders of the National Railways bonds are to renounce a part of the interest payable during the next five years, thereby making more than $25,000,000 available for use for additions and betterments designed to place the Railways in a position to operate more economically. Interest payments on the new bonds will be made on a scale beginning with 2½ per cent in 1931, and increasing each year up to 1936 when normal payments of 5 per cent will be resumed. It is planned to make these payments out of earnings of the National Railways, without calling upon the Mexican Government for any financial aid.

The government now owns 52 per cent of the outstanding stock of the National Railways and it is planned to increase this amount to 65 per cent. It is also planned at some future date to reorganize the present company through the formation of a new one under Mexican laws. Provision is to be made for a prior lien mortgage to finance future capital requirements, under proper provisions for the safeguard of such bonds. All claims and demands between the government and the railways will be cancelled, in order to enable any new company that is formed to begin operations with a minimum of floating debt and to facilitate successful operation.

Reorganization Plan Vital to Refunding

Coupled with the arrangement for the funding of the National Railways indebtedness, which is looked upon in Mexico as a means of salvation for those lines, is the plan for the reorganization of the operations of the Railways, by means of which it is hoped to effect economies sufficient to carry out the schedule of interest payments on the bonds. Actually, the operating results in the

last few years have been satisfactory, with operating ratios of 85, 80 and even 70 per cent—the ratio for 1929 was 81.15—but the net revenues earned under these conditions have not been great enough to pay interest on the bonds, to say nothing of amortizing the principal.

The reorganization plan is extremely comprehensive, touching every conceivable activity of the National Railways. It had its inception in 1928 when Sir Henry Thornton, president of the Canadian National, was called to Mexico as an advisor. The details have been worked out since that time by E. P. Mallory and J. F. Pringle, director of statistics, and assistant general superintendent of transportation of the Central region, respectively, of the Canadian National. The directing power behind the plan is Gen. Plutarco Elias Calles, former president of Mexico, with the title of chairman of the reorganization committee. The connection of General Calles with the scheme is looked upon as practically a guarantee of its success. He has been characterized by public officials of the United States who have known him and watched him at work as an extremely able executive.

There are other forceful and able men in the key positions on the National Railways, who have been placed in those positions since the beginning of the reorganization. Javier Sanchez Mejorada has been president of the Railways for about 10 months, following a period of service with the reorganization committee during the administration of General Calles as president of Mexico. Soon after he was elected president he appointed Lorenzo Perez Castro as executive vice-president and Francisco de P. Landa as vice-president and general manager, both professional men. The National Railways with these and other appointments have been practically removed from the entanglements of national politics.

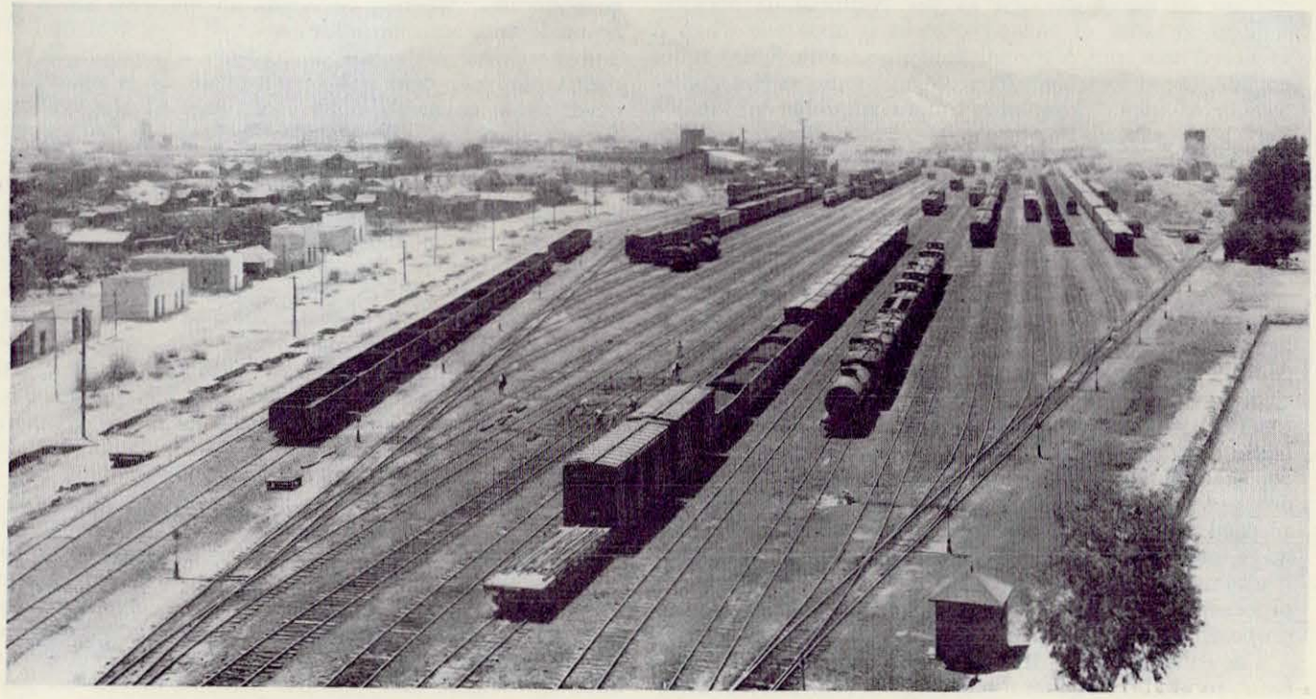
Shop Activities Consolidated

But it is not enough to say that the reorganization plan has been placed in effect. While no statistics of the 1930 operations are yet available, those who have had contact with the National Lines during the last half of 1930 state that the plan is "over the hill"—meaning that it is producing results.

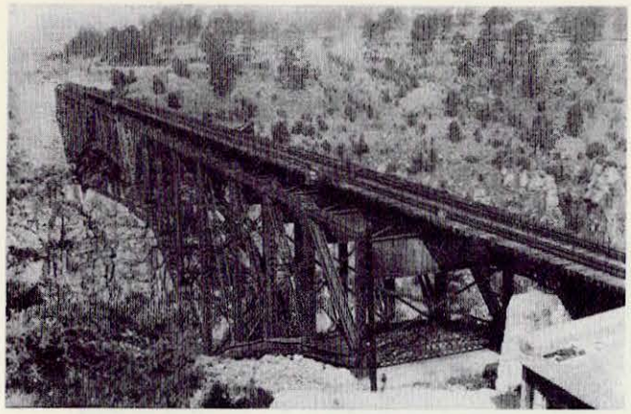
One of the ways in which the plan is producing savings is in the consolidation of equipment maintenance activities. Major locomotive repair work is being discontinued at a number of points and consolidated at Aguascalientes, Ags., Monterrey, N. L., Nonalco, D. F., and San Luis Potosi, S.L.P. Facilities at some eleven other points are being retained to handle light running repairs at roundhouses. Shop extensions in prospect at Nonalco will involve an expenditure of about $400,000, while it is planned to complete the construction of a boiler shop and other improvements at Monterrey at a cost of $250,000. The shops at San Luis Potosi are only partially completed, and since a considerable expenditure will be required to finish them it is expected that it may be possible to concentrate heavy repairs at three points, instead of four.

Within the past two years the National Railways have pursued a program of equipment replacement which has provided those lines with 825 new units of rolling stock. Twenty-five passenger coaches were placed in service in 1929 and early in 1930 United States car builders delivered 600 box cars and 200 gondolas. For the past several months the Railways have had an unplaced inquiry for 10 Mallet locomotives. The only other railway in that country that has been active in the equipment market is the Mexican, the electrified line between Mexico, D. F., and Vera Cruz, Ver. C. This road purchased four passenger coaches, 85 box cars, 15 automobile cars and 15 flat cars during 1930.

Within the near future it is planned to place all divisions on the National Railways under the divisional system of operation in complete charge of the superintendent, instead of under the departmental system, as they are now organized. During the past year the superintendencies of the Tehuantepec and Pan American divisions were abolished and their operation consolidated with the Isthmus division. Likewise the superintendency of the Tampico terminals was consolidated with that of the Cardenas division and the superintendency of the Mexico City terminals was consolidated with that of the Hidalgo division. The divisional system of operation has been placed in effect on the Isthmus and Cardenas divisions.



A Panoramic View of the International Yard at Monterrey, N. L.



Chico River Bridge

A substantial start has been made under the reorganization in the reduction of labor forces in practically all departments of the Railways, which in the past have been more or less over-manned. This reduction is being accomplished in a peaceful and orderly manner under the direction of a labor committee. The labor unions have accepted the reduction of forces in good spirit and have been allowed to confer with the management and take part in the details of the curtailment with a view to protecting their seniority rights.

Train service, as well as other employees, on the National Railways work under an adequate scale of wages. Those who have studied economic conditions in Mexico note the gradual development of a large middle class with a purchasing power far above the average for the country. The high wage scale on the railways is a factor in the growth of this middle class.

Changes in Purchasing Policy

Another consolidation on the National Railways which has been effected within the past year under the plan is the placing of the stores department under the jurisdiction of the purchasing agent, a step that is expected to result in considerable savings in the operation of those two activities. The purchase of supplies and materials was placed on a competitive basis and bids for supplies are now advertised publicly. Other economies in connection with purchases were expected to result in savings of approximately a half million dollars during the last four months of 1930.

Another development of the past year was the speeding up of through passenger service between Mexico and the United States by a reduction of 9 hr. and 45 min. in the time of the fastest southbound train operated between St. Louis, Mo., and Mexico City by the Missouri Pacific and the National Railways of Mexico, via Laredo, Tex.

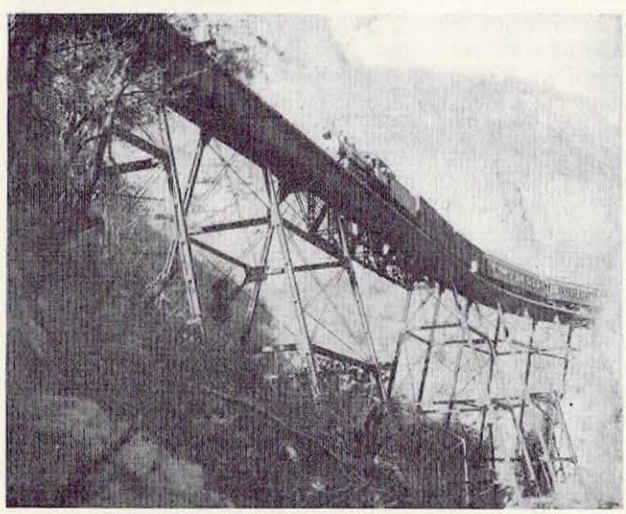
Concurrently, the time of the northbound train was reduced 2 hr., placing it on a 60-hr. and 40-min. schedule for the 1,880 miles. The elapsed time of the northbound train via Laredo is now 61 hr. and 5 min. A reduction of 10 hr. and 5 min., was also made in the southbound schedule of another train also operating via Laredo. Following these changes the Missouri Pacific and the National Railways began the operation of the Sunshine Special as a solid through train between St. Louis and Mexico City. This represents the first instance of the operation of regular service between the two countries including dining and club cars, with no change of equipment in the entire run, since its interruption by the revolution in 1910.

In November the Southern Pacific established triweekly through sleeping car service in conjunction with the National Railways between Los Angeles, Cal., and Mexico City, via El Paso. The Mexican reduced the time of its night train operating in each direction between Mexico City and Vera Cruz by 15 min. These changes and increasing competition from motor coach and air lines operating to about seven points in the vicinity of Mexico City brought about a rearrangement of the schedules of passenger trains operating into and out of Mexico City and the establishment of a new train in each direction between that point and Aguascalientes. The expenditure of about $6,000,000 for the construction of new highways in Mexico during 1930 places the Mexican railways in somewhat the same position as the railways in the United States with respect to competing forms of transportation.

Abandonment of Unprofitable Lines Planned

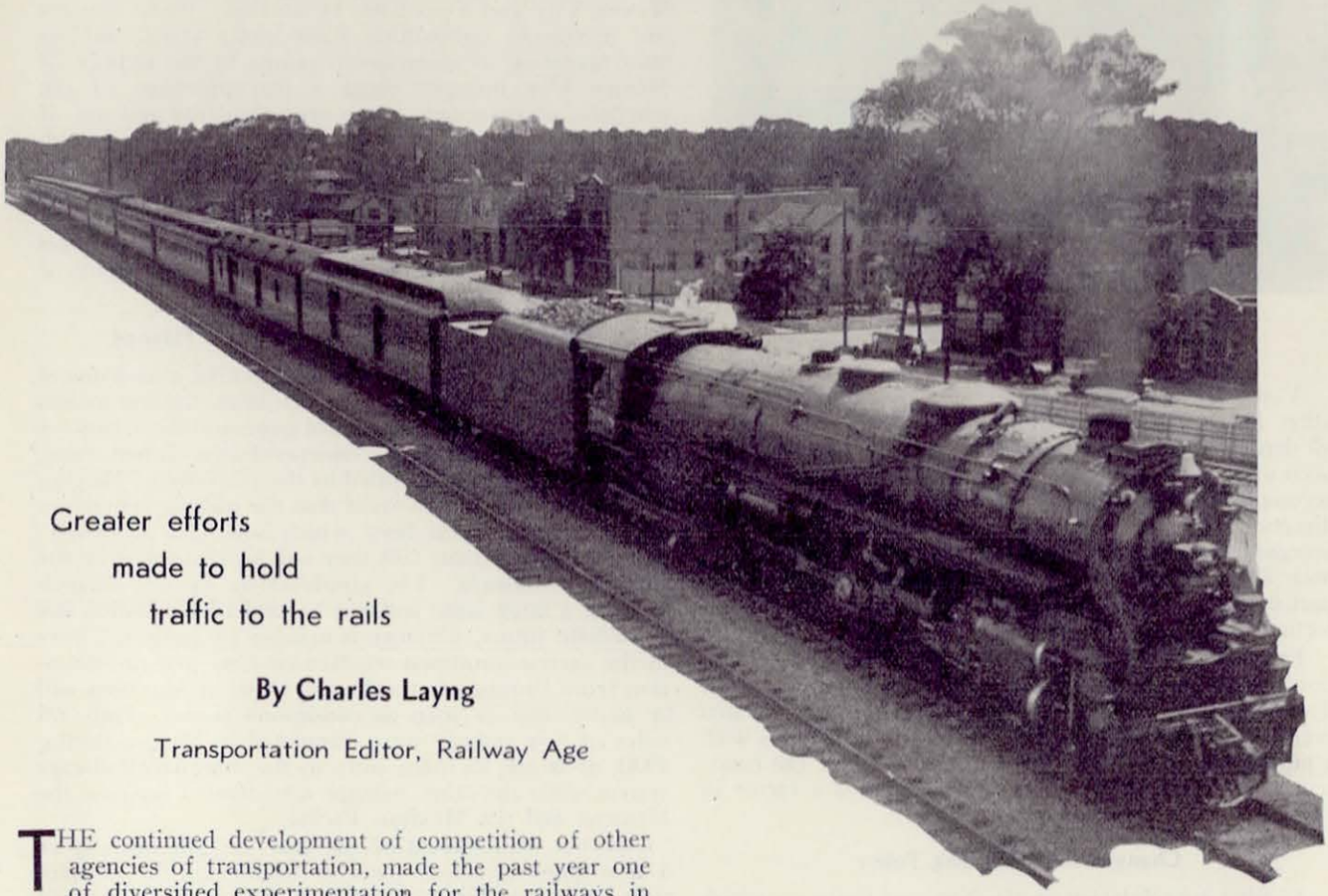
The reorganization plan contemplates the abandonment of a number of unprofitable branch lines, the conversion of narrow gage lines to standard gage and the return of a number of unprofitable independently owned lines, which are now being operated by the National of Mexico, to their owners. In the event that the owning companies refuse to accept these lines, which now have an operating ratio greater than 100, they will be abandoned by the National Railways. The construction of new branch lines on a large scale will not be undertaken within the immediate future, although a number of projected lines in the section southeast of Mexico City and an extension from Durango to the Pacific Coast at Mazatlan will be undertaken as soon as conditions permit. Only 66 miles of new railway were completed in Mexico during 1930, of which 55 miles were in the National Railways system while the other mileage was divided between the Mexican and the Mexican Pacific.

Another development of the year was the opening of a new gateway across the Rio Grande by the completion by the Atchison, Topeka & Santa Fe of the old Kansas City, Mexico & Orient line in the United States from Alpine, Tex., to Presidio, on the international border. This connects with the recently constructed line of the K.C.M.&O. in Mexico at the border. This Santa Fe construction, and connection with its lines in Kansas, completed the line of the Orient in the United States as originally planned by that visionary railroad builder, Arthur E. Stillwell, from the Missouri river to the Rio Grande. Trains began operating on this route on November 1.



De la Mano Canyon Viaduct, Cuernavaca Branch, National of Mexico

Competition Stirs Railways



A Newly Equipped
Chicago-Denver Passenger Train

Greater efforts made to hold traffic to the rails

By Charles Layng

Transportation Editor, Railway Age

THE continued development of competition of other agencies of transportation, made the past year one of diversified experimentation for the railways in both their passenger and freight services. While quick to publicize the unfairness of much of this competition, by joint effort and by statements of individual representatives, the railways did not let matters rest at that. Instead, they followed the policy of recent years even more intensively in 1930, by making every effort to hold their present traffic, and, by various experiments, to bring back some of the traffic lost to competing transportation agencies.

Although passenger traffic continues to decline, the railways, in 1930, evinced no signs of a let-down in their efforts to increase the gap existing between the comforts and luxuries of train travel and those afforded by other means of transportation. Nor were these improvements in comfort entirely for the benefit of the sleeping and parlor-car passenger, for attention was also devoted to providing greater comfort for the day-coach and chair-car passenger. In fact, the efforts to make the comfort contrast with other forms of transportation more pronounced have been intensified, even in comparison with the years immediately preceding which witnessed hitherto unthought-of strides in this direction.

The intensification of the trend might be attributed, in a large measure, to the increasing importance of sleeping and parlor-car travel. In 1929, for the first time, the railways received more revenue from this class of travel than from day-coach travel, the ratio being 51:49, as compared with 31:69 in 1921, for example. The 1929 figures are interesting in other respects. For one thing, they indicate the diminishing power of passenger traffic as a revenue producer, such traffic representing $13.70 of each $100 in revenue received by the railways, as compared with $22.70 in 1919.

For the sixth successive year, the volume of passenger traffic dwindled. In 1920, the average inhabitant made about six more rail trips, and traveled 184 more miles on trains than he did in 1929. The reduction in the number of passengers handled in 1929 was the smallest since 1923, and the loss in passenger miles was only one-third as large as in 1928, and one-fourth as large as in 1927. Figures available for 1930—the first eight months—show a decrease of nearly 2,400,000,000 passenger-miles, or 11 per cent, as compared with a similar period in 1929, and indicate that 1930 was also a year of declining passenger traffic, the loss being the largest since 1921.

Meeting Private Automobile Competition

That the railways are not entirely dispairing regarding the dwindling passenger business is indicated by the expenditures for new equipment and the putting on of new trains. Increasing the attractiveness of train travel is one of the few means available of inducing the public to use the trains rather than their own automobiles. Higher and higher standards of travel luxury are being achieved each year. The progress along these lines in the last five years may safely be said to equal and even exceed the progress in the preceding 15 or 20 years. A development that may have far-reaching results is the putting into service this year, by the Baltimore & Ohio and the Atchison, Topeka & Santa Fe of dining cars equipped with special temperature and humidity controls, which will keep the car at a comfortable, even temperature, regardless of outside weather conditions. The

Pullman Company and the Chicago & North Western placed in service some interesting specialty cars for use in transporting invalids between Chicago and the famous hospital at Rochester, Minn. These cars are equipped with three side doors leading directly into compartments, and materially facilitate the handling of the large number of bed-ridden passengers using these particular trains.

The so-called "overnight" single-bed compartment car usage was extended this year by the construction of cars with convertible beds in such compartments. This permitted the extension of single-room car service from overnight runs, to which they were previously confined, to longer distances, such, for example, as between Chicago and New York, where several such cars are in service. The popularity of this service is indicated by the fact that 23 exclusively single-room cars have been placed in service this year, also 23 other cars containing single-room facilities. There are 11 of the first type of cars operating between Chicago and New York alone. The widespread use of the cars throughout the country is indicated by the fact that they are also operated between New York and Boston, Buffalo, Pittsburgh, Cleveland, Detroit, St. Louis, Montreal and Providence; also between Chicago and Washington, Rochester, Minn., St. Louis, Cleveland, Minneapolis and Lincoln, Neb. Other services are between St. Louis and Oklahoma City; Los Angeles and San Francisco; and Washington and Boston.

The roads between Chicago and St. Louis added several new trains, as well as the roads between Chicago and the Twin Cities, and the competition for traffic in these cases is unusually keen. The new trains were largely the result of a rearrangement of schedules; new trains were added with new equipment and a like number taken off, and the net result was no increase in the total number of trains operating between those points. Three trains were put on between Chicago and St. Louis with schedules equalling the already fast time between those cities. A meeting was held by the Chicago-St. Louis lines to consider the possibilities of pooling the traffic, as has been done successfully in other parts of the country, but an agreement could not be reached.

Among the other new trains put on during the year were the following:

Seaboard Air Line: Norlina, N. C., and Norfolk, Va., and Portsmouth, to give the latter cities direct connection with the main line Florida service.

Chicago & North Western-Union Pacific: Chicago and Denver.

Pennsylvania: Chicago and New York.

Canadian National: Montreal and Toronto.

Central New Jersey-Reading: New York and Williamsport, Pa.

Chesapeake & Ohio: Detroit and Richmond-Norfolk.

Cleveland, Cincinnati, Chicago & St. Louis: Cleveland and St. Louis.

St. Louis Southwestern: St. Louis and the Southwest.

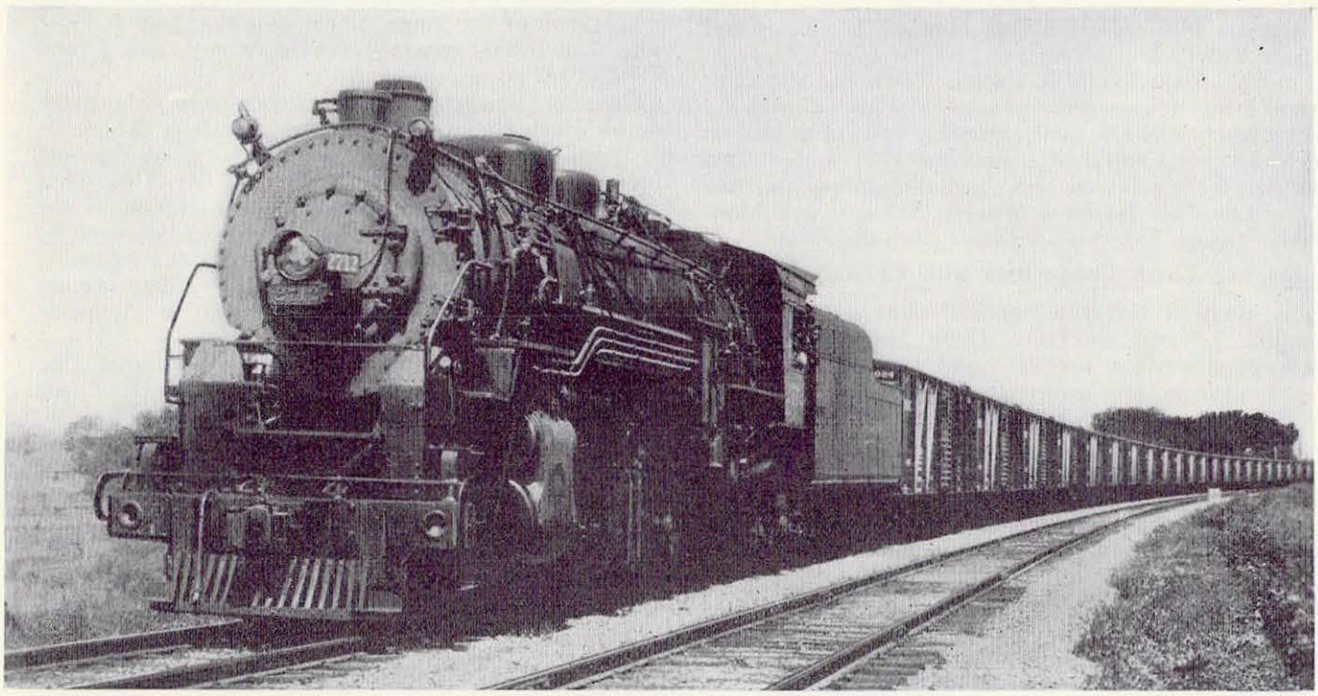
New York, New Haven & Hartford: Boston and New York.

In addition, several new services were added. Among these the Pennsylvania is running regular through boat train service from western points to the North German Lloyd pier at Brooklyn, while another boat train with through car service is being operated from New York to San Francisco to meet the sailings of certain Honolulu-bound boats.

Schedule Reductions

The tendency toward running trains on much faster schedules continued quite as strongly in 1930 as in the two previous years, schedules formerly considered fast being reduced as much as three hours over the longer distances. In some cases, speed has proved a considerable factor in meeting motor coach and other competition, notably between Los Angeles and San Francisco; between Buffalo and New York, and between Toronto and Montreal.

Chief among the schedule reductions were those brought about by the so-called "time war" between the railways serving the Pacific Northwest and those serving California points. These railways have taken turns in reducing schedules most of the year, the latest being a cut of three hours on eastbound trains from the Pacific



Freight Service Has Likewise Been Improved Through the Use of Heavier Locomotives and New Rolling Stock

Northwest, effective November 9. No longer ago than 1928, the fastest time between Chicago and the Pacific Northwest was 72 hr. Successive reductions have brought this down to 58 hr. eastbound, a reduction of 14 hr. in the three-year period, and 59 hr. 45 min. westbound, a reduction of 12 hr. 15 min. To compete with this, in the same period the Chicago-California lines have reduced their schedules from 68 hr. to 57 hr. eastbound and 56 hr. 30 min. westbound, reductions of 11 hr. and 11 hr. 30 min. respectively. So far, the history of this time war has been that each group of lines eventually met the reductions made by the other group. The result is that residents and visitors to the Pacific Coast, already enjoying the fastest long-distance schedule in the world, now have ultra-fast schedules at their service when they desire to travel from or to the Pacific Coast. At the present writing, there is no telling where or when the "war" will end.

These reductions have materially shortened the time between the terminals and intermediate points, and have affected practically all the schedules in the West. Such runs as those between Chicago and the Twin Cities, and Chicago and Omaha, have been speeded up to a considerable extent, not only on the transcontinental trains, but also on the de-luxe trains which operate only between the points mentioned.

Other cuts in what was hitherto the fastest time include the following:

Nashville, Chattanooga & St. Louis: Nashville and Memphis, 1 hr.

Southern Pacific: Portland and San Francisco, 50 min.

Southern Pacific: San Francisco and Los Angeles, 30 min.

Great Northern: Seattle and Vancouver, 30 min.

Various lines: Chicago and Denver, 30 min.

Pennsylvania: New York and St. Louis, 1 hr.

New York Central: New York and St. Louis, 1 hr.

Pennsylvania: Chicago and Pittsburgh, 40 min.

New York Central: New York and Buffalo, 30 min.

Canadian National: Toronto and Montreal, 1 hr. 30 min.

Canadian National: Chicago and Montreal, 4 hr. 10 min.

Missouri Pacific-National of Mexico: St. Louis and Mexico City, 9 hr. 45 min.

Chicago, Rock Island & Pacific: Memphis and California, 4 hr.

This has resulted in some extremely fast trains, one on the New York Central between New York and Buffalo averaging 51.4 miles an hour, including stops, and two on the Canadian National between Toronto and Montreal averaging 55.6 miles an hour, including stops.

Meeting Coach Competition with Reduced Fares

The use of so-called "excursion" rates was extremely widespread during the year. These, however, were of far wider scope than formerly, and, in a number of instances, seem to have won traffic back to the railways to a certain extent. Instead of confining the rates to day-coach trains and to short distance travel as heretofore, this year they were quoted for all sorts of distances and all sorts of trains. For example, one offering by the Western lines was a round trip between Chicago and California at one and one-third times the regular fare, tickets at this rate being honored on all trains, even including the extra-fare trains.

One of the outstanding innovations in fares has, however, been announced by the western lines operating between Chicago and other midwestern points and the Pacific Coast. This took effect on January 1, 1931, and is extending over a trial period of six months, consisting, in effect, of the establishment of first, second and third class rates.

The first-class rate is based upon the usual fare of approximately 3.6 cents a mile, and permits the use of standard sleeping cars on payment of the additional charge for the space occupied. The second-class rate is to be approximately 20 per cent less than the first-class, or on a basis of about three cents a mile. Tickets at these rates will be honored in tourist sleepers only. The third-class rate will be nearly 40 per cent less than first-class, and this class of tickets will be honored only in coaches and chair cars. The total fare, including sleeping car charges on first and second-class tickets, will be $103.47 for first, $77.75 for second, and $50 for third. Needless to say, this experiment will be carefully watched and its results closely analyzed.

Roads in the Southwest have been particularly active in the reduction of fares for ordinary travel as a means of meeting motor coach competition. The Texas & Pacific has placed a two-cent per mile rate in effect on all local trains in Louisiana for a three-month period, following the successful operation of a two-cent rate during a trial period on its lines in Texas.

Air-Rail Developments

A steady growth was shown during the year in air-rail transportation. This development, which had its tentative beginnings in 1928, got into full swing in 1929, and gives promise of further possibilities. The railways have displayed a keen interest in air competition since its inception and are considerably more involved in the business than they were during the early years of motor coach competition.

The trans-continental air-rail lines operated by the Pennsylvania and the Atchison, Topeka & Santa Fe in conjunction with the T.A.T.-Maddux air lines, made a further reduction in fare this year of $91.00, bringing the rate down from $267.43 to $176.43. At the same time, reductions in fares were made between all intermediate stations, on the basis of seven cents a mile. Originally the rate was on the basis of five cents per mile, and while the volume of traffic increased at that rate, it was too low to be profitable. During the first year of operation of this route, which ended on July 1, 1930, more than 30,000 passengers were carried, and a total of 1,250,000 plane miles flown.

This fall, however, new schedules were announced, one of which eliminates the railway entirely, planes being flown from New York to Kansas City one day, and from Kansas City to the coast the next day. The other transcontinental schedule eliminates one section of the rail journey. Passengers leave New York at night by train, boarding planes at Columbus, Ohio, the following morning, the remainder of the journey being accomplished by air, with an over-night stop at Amarillo, Texas.

The Chicago & North Western is another road that was active during the year in the establishment of new air-rail lines. A Chicago-Grand Rapids service was begun, using the railway between Chicago and Milwaukee, and flying across Lake Michigan between Milwaukee and Grand Rapids. This was followed by the opening of the Pacific Northwest for air-rail transportation, which has the effect of establishing a new transcontinental air-rail line. Planes of the Mamer Air Transport Company leave Spokane, Wash., in the morning, arriving at St. Paul at night. Passengers are transferred to C. & N. W. trains for the overnight run to Milwaukee. They fly from Milwaukee to Grand Rapids in the plane of the Kohler Aviation Company, and make connections

(Continued on page 118)

A Review of Railway Operations in 1930

Dr. Julius H. Parmelee

Railroads hard hit by general business conditions, but played their part well—Outlook more promising

By Dr. Julius H. Parmelee
Director, Bureau of Railway Economics

NEVER have railway traffic statistics proved themselves a more faithful index of general business conditions than they did during the year 1930. Always considered an excellent barometer of commercial activity, carloadings showed themselves during the past year, when business was down, an unusually accurate reflex of that activity.

Many times during the year business leaders were quoted as foreseeing an immediate upturn in one or another of the underlying factors, but it happened almost invariably that the then current carloading statistics were denying the accuracy of their forecasts. In every case, railway traffic turned out to be a more effective barometer than the judgment of even the best informed of our commerical leaders.

The story of railway operations during the year 1930, viewed from a narrow angle, does not make for wholly pleasant reading. Traffic and revenues were off, in sympathy with the lowered tempo of business. Yet there are bright spots in the picture that call for comment and consideration.

Let us look first at the dark side. Freight traffic in 1930 ran below that of 1929, not only during the year as a whole, but during every month of the twelve, and during every week of the fifty-two. What is worse, the percentage of decline showed an almost consistent tendency to increase as the year went on. These facts are brought out in some detail at a later point; it need only be stated here in summary fashion that in 1930 railway freight traffic was down, that passenger traffic was down, and that every group of railway revenues, including mail, express, and the like, showed considerable declines.

Operating expenses were held vigorously in check by the railways, and the percentage of reduction was gradually increased during the latter part of the year, in line with the increasing rate of decline in traffic and revenues. Railway taxes also decreased, largely because of the reduced net income of the railways. Even so, not enough reductions occurred in operating expenses and in taxes to offset the decline in revenues. Net operating income, therefore, showed a decline of nearly 30 per cent. The rate of return on property investment, which naturally moves in parallel lines with net operating income, averaged only 3.41 per cent during 1930, compared with 4.95 per cent in 1929. The rate of return was lower in each and every month of 1930 than during the corresponding months of the preceding year.

High Operating Efficiency

Consider now some of the brighter phases of the year. In the first place, railway operating efficiency remained on a high plane, thus contributing mightily to the stabilization of industry in 1930. True, the technical index of operating efficiency dropped slightly below 1929, but it was higher than in any other year since the war, and even the decline of 1930 was due to certain factors lying outside of railway control. This point will receive attention later.

In those factors of performance that are more closely regulated by managerial influence, the record for 1930 equalled or surpassed previous years. Careful analysis indicates that railway operations in 1930 maintained the progressive drive of recent years toward adequate, prompt, and effective transportation service. This view is supported by the conclusion of the Secretary of Commerce, who said in his annual report for 1930:

"In fact, the quality of service furnished by the railways, as well as other public carriers, has continued to improve and is now better than at any other time in the history of the country. Car shortages have become rare occurrences. At present it takes only from one-half to two-thirds as long to move goods a given distance as it did a decade ago. The increasing efficiency with which traffic is handled has enabled producers to make quicker deliveries and distributors are able to carry smaller stocks and to turn over their capital more quickly."

Again, the railway industry made some special contributions to stabilization in 1930. Its program of capital improvement was carried out on a larger scale than

in 1929, thus aiding the industries that supply the railways and stimulating employment of labor in those lines. In addition, the voluntary drought-relief reductions in freight rates proved helpful to agriculture in those sections where climatic conditions had affected the farmer and producer to the greatest degree.

Finally, the railways join with other industries in looking forward to improvement in the near future. Pessimism is usually most severe just before the dawn, in the same way that optimism usually rides most buoyantly in advance of a commercial crash. So the turn of the year finds railway executives hopeful for and expectant of better times in 1931.

Looking Ahead

In this connection, a longer look ahead may be warranted. How safe it is to predict the future from the past is always a debatable question. Yet analysis of the past always brings out points of interest, and supplies wholesome food for thought. What have previous reactions in railway traffic shown us to expect, in the way of the speed at which the reaction has spent itself, and the time required to return to normal?

Chart A may throw some light on this question. This graph shows the trend of revenue ton-miles and revenue

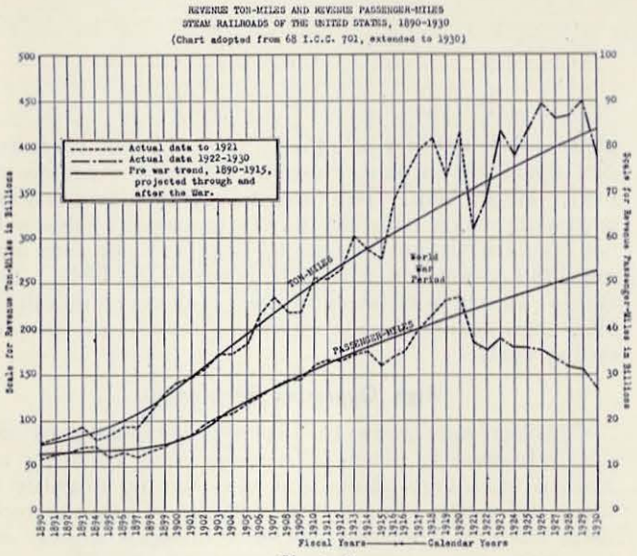

REVENUE TON-MILES AND REVENUE PASSENGER-MILES
STEAM RAILROADS OF THE UNITED STATES, 1890-1930
(Chart adopted from 68 I.C.C. 701, extended to 1930)
Actual data to 1921
Actual data 1922-1930
Pre war trend, 1890-1915, projected through and after the War.
TON-MILES
PASSENGER-MILES
World War Period
Scale for Revenue Ton-Miles in Billions
Scale for Revenue Passenger-Miles in Billions
Fiscal Years
Calendar Years

Chart A

passenger-miles, over a period of 40 years from 1890 to 1930. It is adapted from a similar graph used by the Interstate Commerce Commission in its decision in Reduced Rates, 1922, with the actual data brought up to date. The Commission's chart gave the normal trend lines (in solid black) from 1890 to 1930, calculated from the pre-war trends from 1890 to 1915. The dotted lines to 1921 appeared in the Commission's chart; the dash-and-dot lines are extensions to 1930, inserted by the Bureau of Railway Economics on the basis of traffic statistics for the year 1922 to date.

The trend of passenger-miles has been almost steadily downward since 1920, and the spread between the normal and actual trend lines has become more and more pronounced. As to that phase of railway traffic, the long-time history of the past offers little to guide us.

In the case of freight traffic, the normal and actual trends of ton-miles have run more nearly together, and analysis of the whole period may offer a clue to cyclical movements in that traffic factor.

Studying the ton-mile curve during the whole period, it appears that five major downward reactions have occurred—in 1894, 1908, 1913, 1921, and 1930. While these reactions varied in intensity, none of the four earlier ones lasted longer than two years, some no longer than one year, and each of them was more than wiped out in two years from the low point.

Thus freight traffic in 1895 rose above 1894, and by 1896—two years after the decline—was slightly above the peak of 1893. The traffic of 1909 showed a slight increase over 1908, and in 1910—two years later—struck a new high level. The traffic of 1915 declined under 1914, but came back in another year—two years after the beginning of the decline in 1914—to a new peak in 1916. Following the worst decline of all, in 1921, freight traffic climbed steadily back in two years to a new peak in 1923.

If history repeats itself—and the "if" should be noted—freight traffic may or may not show an increase in 1931 over 1930, but will be well out of the valley by 1932. In fact, the trend from 1930 to 1931 is more likely to be up than down, with a still more rapid upward trend in 1932.

Those who follow this reasoning critically will of course point out that new elements of traffic competition are in existence today, which were not a part of our transportation structure in earlier periods, and that in the face of more severe competition the railways may find it increasingly difficult to bring their freight traffic up to new high levels. Granting this argument, yet emphasizing that the railways still have an important role to play in the movement of freight throughout the United States, it will be a matter of keen interest to follow the traffic trend in 1931, and to learn whether history is destined to repeat itself, or whether the coming year will be "just another year" to bring renewed anxiety to railway managements and employees.

Prominent Features of 1930 Operation

The outstanding features of railway operation in 1930 may be set out in summary form as follows:

1. Freight traffic in 1930 declined nearly 14 per cent under 1929. Net ton-miles were off 13.9 per cent, while revenue carloadings decreased 13.4 per cent. These declines brought the freight movement of 1930 down to the level of 1924.

2. Passenger traffic declined 13.8 per cent, and was less in amount than in any previous year since 1906.

3. Total operating revenues declined 15.5 per cent. The aggregate for the year was lower than in any previous year since 1919.

4. Total operating expenses were lower than in 1929 by 12.5 per cent, and fell below those of any preceding year back to 1917. Each of the general groups of operating expenses showed reductions, ranging from 15.3 per cent for maintenance of way and structures down to 1.5 per cent for traffic expenses.

5. The operating ratio in 1930 averaged 74.3 per cent, compared with 71.7 per cent in 1929. This contrasts with an almost steady decline in the ratio from 1920 to 1929.

6. Net railway operating income aggregated $898,000,000 in 1930, which was a decline of $377,000,000, or 29.6 per cent, under 1929.

7. The rate of return on railway property investment averaged 3.41 per cent in 1930. This was the lowest rate of return recorded since 1921.

8. The technical index of railway efficiency in 1930 fell slightly below that of 1929, but stood higher than in any previous year since the war.

9. Five factors of railway performance made new records during the year 1930.

Freight and passenger traffic both declined in 1930, in contrast to the fact that in recent years the general tendency of freight movement has been upward and that of passenger movement downward.

Table I presents a summary of the freight and passenger traffic statistics of the years 1926 to 1930 separately, with annual averages for the five years from 1925 to 1929. Freight traffic is shown in terms of both carloadings and ton-miles. The freight railway traffic of each of the years from 1926 to 1929, it will be recalled, was greater in amount than that of any year prior to 1926.

Table I—Comparative Traffic Statistics

Revenue Carloadings	
1930	45,850,000
1929	52,948,000
1928	51,590,000
1927	51,636,000
1926	53,099,000
5-year average, 1925-9	52,099,000
Net Ton-Miles	
1930	424,000,000,000
1929	492,180,000,000
1928	477,183,000,000
1927	474,696,000,000
1926	488,702,000,000
5-year average, 1925-9	477,770,000,000
Passenger-Miles	
1930	26,800,000,000
1929	31,078,000,000
1928	31,616,000,000
1927	33,656,000,000
1926	35,499,000,000
5-year average, 1925-9	33,562,000,000

All the statistics reviewed in this and succeeding tables and charts relate to railways of Class I, and all are subject to such revision as may become necessary when the final reports for the year 1930 are made public.

Carloadings

Revenue loadings of freight in 1930 aggregated 45,850,000 cars, equivalent to an average of 882,000 per week.

There were no million-car-or-over weeks in 1930, which is out of line with the experience of the seven preceding years. The peak traffic of the year was handled in the week ending August 30, when total loadings reached 984,504 cars. The annual peaks for the past five years have fallen in the weeks ending as indicated below:

	High Week
1926 (Oct. 26)	1,208,878*
1927 (Oct. 19)	1,129,055
1928 (Sept. 28)	1,196,965
1929 (Sept. 28)	1,203,139
1930 (Aug. 30)	984,504

* All-time record.

No million-car weeks were reported prior to 1920. Beginning with that year, they have ranged in number annually as follows:

	Million-car Weeks
1920	5
1921	None
1922	None
1923	21
1924	11
1925	20
1926	27
1927	28
1928	24
1929	28
1930	None

NET TON-MILES, BY MONTHS

(5-year average 1925-1929, and years 1929 and 1930)

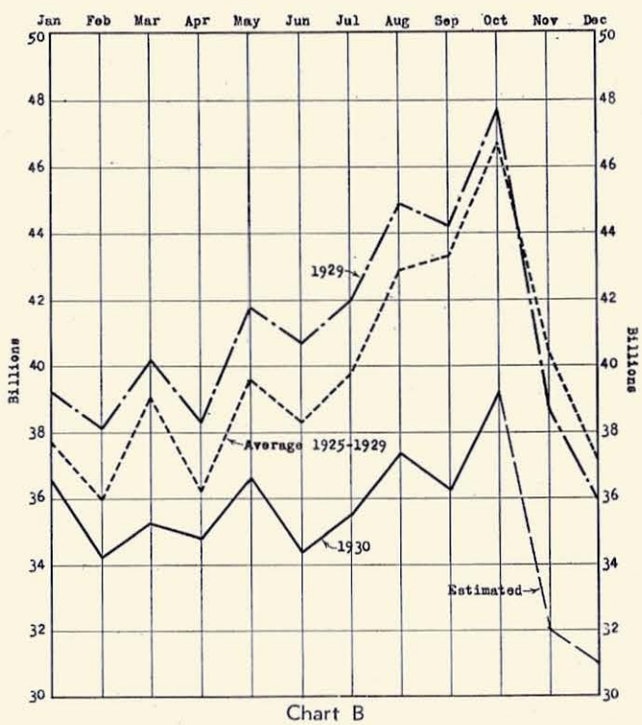


Chart B

Ton-Miles

Net ton-miles in 1930 aggregated 424,000,000,000, a decrease of 13.9 per cent under 1929.

Chart B shows the curve of net ton-miles for each month in 1930, compared with 1929 and the five-year annual average, 1925 to 1929. Every month of 1930 reported a smaller ton-mile total than for either 1929 or the five-year average. What is worse, the decline under 1929 grew almost steadily greater, from the beginning to the end of the year. This is indicated in Table II, which gives both a monthly and a cumulative comparison with 1929.

Table II—Percentage Decline in Net Ton-Miles, 1930 under 1929

	Monthly	Cumulative
January	6.5	6.5
February	10.0	8.1
March	12.2	9.5
April	9.0	9.4
May	12.6	10.1
June	14.5	11.0
July	15.3	11.7
August	16.8	12.4
September	18.1	13.0
October	17.9	13.6
November	17.3	13.9
December	14.0	13.9
Year	13.9	13.9

Each of the three districts suffered. Ton-miles fell off 14.3 per cent in the Eastern and Southern districts, and 13.2 per cent in the Western district.

Another approach to this question of traffic trends may be made by comparing increases or decreases in carloadings on the basis of a three-month "moving average." This method relates any two years to each other on the basis of successive periods of three months each, passing from one period to the next by dropping the first month, and adding a month at the other end.

Table III—Moving Average of Carloadings by Three-Month Periods

Period	Per Cent Change
Nov.-Jan. (1929)	I 6.8
Dec.-Feb.	I 4.8
Jan.-Mar.	I 3.0
Feb.-Apr.	I 3.9
Mar.-May	I 4.0
Apr.-June	I 6.2
May-July	I 5.8
June-Aug.	I 5.5
July-Sept.	I 3.7
Aug.-Oct.	I 1.9
Sept.-Nov.	D 1.7
Oct.-Dec.	D 3.7
Nov.-Jan. (1930)	D 5.6
Dec.-Feb.	D 6.1
Jan.-Mar.	D 7.3
Feb.-Apr.	D 8.2
Mar.-May	D 9.7
Apr.-June	D 11.3
May-July	D 12.9
June-Aug.	D 15.0
July-Sept.	D 16.4
Aug.-Oct.	D 17.6
Sept.-Nov.	D 17.3
Oct.-Dec.	D 17.2

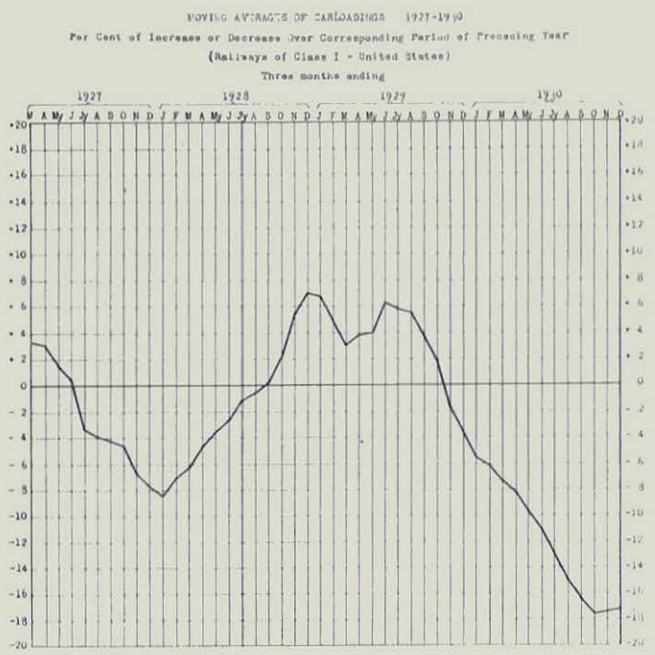


Chart C

Table III presents such a three-month moving average of carloadings for the years 1929 and 1930, the percentages being in each case the percentage of change (I = increase and D = decrease) over or under the corresponding periods one year earlier.

The first 10 periods ending in 1929 showed increases, then followed a long and gradually growing succession of decreases, extending to the end of the year 1930.

This table makes it evident that the bottom had not been reached at the end of 1930, the slight upturn in November and December (from a decline of 17.6 per cent in October to 17.3 and 17.2 per cent, respectively) being due rather to the low traffic in 1929 against which the latter comparisons were made, than to any real improvement in relative conditions in 1930.

Chart C is based on the figures included in Table III, but covers a longer period of four years, showing the trend from the beginning of 1927 to the close of 1930. Significant is the downward sweep in 1927; the steady rise in 1928; the hesitating tendency of the curve in early 1929, followed by a steady downward plunge to the fall months of 1930.

Loadings According to Commodity Groups

Table IV distributes the revenue carloadings of 1930 among the eight commodity groups of the Car Service Division's classification. The carloading figures are shown for 1930, while the comparative percentage distribution is included for both 1930 and 1929.

Table IV—Distribution of Loadings, by Groups

	Number 1930	Per Cent 1930	Per Cent 1929
Grain and Products	2,240,000	4.9	4.5
Live stock	1,280,000	2.8	2.7
Coal	8,101,000	17.7	17.5
Coke	472,000	1.0	1.2
Forest products	2,380,000	5.2	6.2
Ore	1,657,000	3.6	4.3
Merchandise, L. C. L.	12,187,000	26.6	25.0
Miscellaneous	17,533,000	38.2	38.6
Total	45,850,000	100.0	100.0

Grain and grain products, live stock, coal, and merchandise loadings showed increases in ratio to total carloadings. That is, these four groups declined at a somewhat lesser rate in 1930 than did all commodities on the average. The remaining four groups—coke, forest products, ore, and miscellaneous (chiefly manufactures)—fell off at more than the average rate.

Financial Results in 1930

Total operating revenues in 1930 aggregated $5,365,000,000, a decrease of $987,000,000, or 15.5 per cent, under the total of $6,352,000,000 attained in 1929. This was the smallest revenue total since 1919.

Total operating expenses amounted to $3,985,000,000, dropping below the four-billion mark for the first time since 1917. The total for 1930 was a reduction of $569,000,000 under 1929, or 12.5 per cent.

The operating ratio stood at 74.3 per cent, compared with 71.7 per cent in 1929. This increase in 1930 was the result of a greater absolute and relative decrease in revenues than in expenses.

Railway taxes in 1930 amounted to $356,000,000. This was a decrease of $46,000,000, or 11.4 per cent, under 1929, and reflects the reduced net income of the year 1930. The ratio of taxes to operating revenues, however, rose to a higher level in 1930 than ever before, averaging 6.6 per cent throughout the year. This compares with 6.3 per cent in 1929, and the previous high mark of 6.4 per cent in 1928.

That is, 6.6 cents of every dollar of railway revenues in 1930 was absorbed by federal, state, and local tax requirements. This measures the relative incidence of taxes more accurately than do the figures of gross amounts paid out in taxes, and indicates that there was no lightening of the tax burden in 1930.

This proportion—taxes per dollar of revenue—has been growing rapidly. The almost steady upward trend from 1921 to 1930, for example, is indicated in the following table:

	Railway Taxes Cents per Dollar of Revenue
1930	6.6
1929	6.3
1928	6.4
1927	6.1
1926	6.1
1925	5.9
1924	5.8
1923	5.3
1922	5.4
1921	5.0

The increase of three-tenths of one cent per dollar in 1930 does not bulk large at first sight, but if we consider that when applied to the total revenues of the year it represents an increase of more than $16,000,000, the significance of the increase becomes more clearly evident.

Net operating income is the remainder of operating revenues, after operating expenses, taxes, and certain rental items have been met. The net for 1930 dropped below $900,000,000 for the first time since 1922. The actual decline was from $1,275,000,000 in 1929 to $898,000,000 in 1930, or 29.6 per cent.

Table V presents a condensed railway income account for the years 1930 and 1929, and for the annual average of the five years from 1925 to 1929.

Table V—Condensed Railway Income Account

	1930 (millions)	1929 (millions)	Average 1925-1929 (millions)
Total operating revenues	$5,365	$6,352	$6,281
Total operating expenses	3,985	4,554	4,595
Taxes	356	402	388
Net operating income	898	1,275	1,185
Operating ratio	74.3%	71.7%	73.2%

Table VI sets out the rate of return on railway property investment, for each year from 1921 to 1930. Because statistics are as yet incomplete regarding the amount of the railway investment at the end of 1930, the rate of return is computed for that year (also for

1929, by way of comparison) on the basis of the investment at the beginning of the year, whereas for the other years in the table the rate is computed on the end-of-the-year investment, thus following the method utilized by the Interstate Commerce Commission. As investment usually increases slightly during a year, the rate base also increases and the rate calculated on the base at the close of the year would be slightly less than when calculated on the investment at the year's beginning.

Table VI—Rate of Return on Property Investment (Including materials, supplies, and cash)

Computed on investment at *beginning* of year:	
1930	3.41%
1929	4.95
Computed on investment at *end* of year:	
1929	4.84%
1928	4.64
1927	4.29
1926	4.98
1925	4.74
1924	4.21
1923	4.33
1922	3.58
1921	2.84

The rate of return for 1930 was 3.41 per cent, nearly one-third below the 4.95 per cent attained in 1929. Corresponding rates of return for the three districts in 1930 separately stood as follows: Eastern District, 3.84 per cent; Southern District, 2.68 per cent; Western District, 3.18 per cent.

Summarizing the table, the rate of return fell in 1930 to a point lower than in any of the 10 years from 1921 to 1930, except 1921 alone. The latter year was also a period of severe traffic and revenue declines.

Railway Operating Revenues

Table VII shows the statistics of the principal items of railway operating revenue in 1930, compared with 1929 and the five-year period.

Table VII—Operating Revenues

	1930 (millions)	1929 (millions)	Average 1925-1929 (millions)
Freight revenue	$4,105	$4,826	$4,710
Passenger revenue	735	874	970
Mail revenue	107	151	109
Express revenue	114	148	146
All other revenue	304	353	346
Total	$5,365	$6,352	$6,281

Total operating revenues in 1930 fell 15.5 per cent below 1929 and 14.6 per cent below the annual average of the preceding five years. Every revenue group showed similar trends, below 1929 and below the five-year average.

Comparing 1930 with 1929, freight revenue declined $721,000,000, or 14.9 per cent. The total for 1930 was $4,105,000,000. Passenger revenue fell by $139,000,000, or 15.9 per cent.

Mail revenue showed the largest relative decline in 1930, but this was due largely to the back mail pay received by the railways from the government in 1929. A more nearly accurate comparison is with the five-year average, the total mail revenue in 1930 showing a decline of $2,000,000 under the five years, or nearly two per cent.

Express revenue decreased 23.0 per cent in 1930, while "all other" revenue declined 13.9 per cent.

Railway Operating Expenses

Table VIII is a condensed statement of the operating expenses incurred in 1930, compared with 1929 and the five years to 1929.

Table VIII—Operating Expenses

	1930 (millions)	1929 (millions)	Average 1925-1929 (millions)
Maintenance of Way	$ 731	$ 863	$ 859
Maintenance of Equipment	1,027	1,211	1,236
Traffic	128	130	119
Transportation	1,868	2,110	2,152
General and other	231	240	229
Total	$3,985	$4,554	$4,595

Each of the principal expense accounts showed decreases in 1930, under 1929, and the three largest accounts—transportation, maintenance of equipment, and maintenance of way—were also lower than the five-year average.

Operating expenses as a whole amounted to $3,985,000,000. This was a reduction of $569,000,000, or 12.5 per cent, under 1929.

It will be recalled that traffic was off about 14 per cent in 1930. It is always difficult to reduce expenses as fast as revenue declines; so many of the current costs of operation do not vary with the traffic that the problem of retrenchment is a serious and complex one. The railways met the problem in 1930 by a progressive program of economy; operating expenses during the first six months of the year were reduced 7.8 per cent, while during the second six months the reduction was 17.1 per cent.

Maintenance of way expenses in 1930 declined 15.3 per cent, and maintenance of equipment expenses 15.2 per cent. Transportation expenses decreased 11.5 per cent.

Revenue per Traffic Unit

Table IX indicates the average revenue received by the railways of Class I for the transportation of the average ton of freight one mile, and the average passenger one mile. The comparative statistics cover the 10 years from 1921 to 1930, which is the period since the general rate increase authorized by the Interstate Commerce Commission in August, 1920.

Table IX—Revenue Per Ton-Mile and Passenger-Mile, 1921-1930

	Revenue per ton-mile (cents)	Revenue per passenger-mile (cents)
1930	1.065	2.730
1929	1.076	2.808
1928	1.081	2.850
1927	1.080	2.896
1926	1.081	2.936
1925	1.097	2.938
1924	1.116	2.978
1923	1.116	3.018
1922	1.177	3.027
1921	1.275	3.086

Freight revenue per ton-mile shows an almost steady decline, from 1.275 cents in 1921 to 1.065 cents in 1930. The decline for the whole period was 16.5 per cent, and from 1929 to 1930 1.0 per cent. Changes in average revenue per ton-mile may be due to other factors than readjustment in basic freight rates. It is also true that rate readjustments are an important factor, and that whatever the cause of the decline in average revenue per ton-mile, an appreciable effect is registered on aggregate railway revenue.

Passenger revenue per passenger-mile declined from 3.086 cents in 1921 to 2.730 cents in 1930. The proportionate decline was 11.5 per cent between 1921 and 1930, and 2.8 per cent between 1929 and 1930.

In the case of both freight and passenger business, the average revenue per traffic unit reported for 1930 was lower than in any of the previous years of the ten-year period covered by the table.

Gross Capital Expenditures

Table X is a summary of the gross capital expenditures of railways of Class I, from 1923 to 1930. The year 1923 marked the beginning of the railways' program for increased efficiency of operation. The item included for 1930 is estimated on the basis of reports made to the Bureau of Railway Economics for the first nine months of that year.

Table X—Gross Capital Expenditures

1930	$ 875,000,000
1929	853,721,000
1928	676,665,000
1927	771,552,000
1926	885,086,000
1925	748,191,000
1924	874,744,000
1923	1,059,149,000
Total—eight years	$6,744,108,000

Gross capital expenditures for 1930, without allowance for retirements or abandonments, are estimated at not less than $875,000,000. The total may go as high as $900,000,000. This total was larger than in any of the eight years from 1923 to 1930, save only 1923 and possibly 1926. It was greater than in 1929, and to that extent reflects the successful effort of the railway industry to increase its capital program and so offer its contribution to the solution of the unemployment problem of 1930. The program also contributed to the stabilization of American industry during the period of stress through which it was passing in that year.

Equipment Installations

Monthly reports now available, with respect to new units of equipment placed in service, exclude units leased by railway companies to other railway companies. Prior to 1929, the totals included some units transferred from one railway company to another, which are bookkeeping transactions so far as the railway industry as a whole is concerned.

On this basis of new units only, the total installations for 1929 and 1930 compare as shown in Table XI, below.

Table XI—Equipment Installations

	Installed Jan. 1-Nov. 30	On Order Dec. 1	Total
Locomotives:			
1930	744	92	836
1929	716	299	1,015
Freight cars			
1930	75,936	3,884	79,820
1929	76,773	30,569	107,342
Passenger cars*			
1930	1,389	1,740	3,129
1929	2,020	2,036	4,056

* Figures are for nine months and Oct. 1.

With respect to locomotives, more units were put into service during the first 11 months of 1930 than 1929. The number on order on December 1, however, was considerably less. Freight cars installed during the first 11 months of 1930 fell off slightly, and the number remaining on order was much smaller. In the case of passenger cars, both the number installed during nine months and the number on order October 1 were reduced.

While retirements of locomotives and freight cars were heavy during 1930, the greater average power and capacity of the installed units ran so much above the averages of the units retired that the result was a net increase in the aggregate tractive power of all locomotives and the aggregate capacity of all freight cars in service.

Railway Employees

The number of railway employees showed a decline in 1930, although the decrease was relatively smaller than the declines in traffic, in revenues, and in expenses.

The average number of men and women on railway payrolls during the year was 1,545,000, compared with 1,686,000 in 1929 a decrease of 8.4 per cent. Aggregate compensation to employees fell from $2,940,000,000 in 1929 to $2,657,000,000, or 9.6 per cent. Average annual earnings per employee were $1,720 in 1930, compared with $1,744 in 1929 and $1,703, in 1928. The decline in this average between 1929 and 1930 occurred not as a result of wage rate reductions, but was the composite result of a lesser amount of overtime, shorter hours in some cases, and changes in the percentage distribution of the employees among the several class of work and compensation.

Railway Operating Efficiency

The average index of operating efficiency showed a slight decline in 1930, due partly to the fact that with a smaller amount of traffic offered the railways were unable to increase their train loads; principally to the fact that the great increase in the number of stored locomotives and surplus freight cars reduced the apparent daily performance of those two groups of equipment.

Despite this fact, progress was made in a number of factors, particularly those with respect to which railway control is wholly or nearly complete. These factors are freight train speed, locomotive fuel consumption, and ton-miles per freight-train hour, where record achievements were attained in 1930. Five new records were established in 1930 with respect to these factors, as follows:

Operating Records in 1930 (First Ten Months)

	1930	1929
1. Freight train speed (M.P.H.)	13.7	13.1
2. Gross ton-miles per train-hour	25,869	24,625
3. Net ton-miles per train-hour	10,886	10,653
4. Fuel consumption per unit (lbs. per 1000 G.T.M.—freight)	120	123
5. Fuel consumption per unit (lbs. per P.T.C.M.—passenger)	14.5	14.7

The index of operating efficiency has heretofore been computed on the basis of thirteen selected factors of performance. This index is here continued on a similar basis for 1930, utilizing the same thirteen factors, as follows:

1. Freight car-miles per car-day.
2. Net ton-miles per car-day.
3. Gross tons per freight train.
4. Net tons per freight train.
5. Gross ton-miles per freight train-hour.
6. Net ton-miles per freight train-hour.
7. Locomotive-miles per locomotive-day (Freight).
8. Locomotive-miles per locomotive-day (Passenger).
9. Percentage serviceable locomotives (Freight).
10. Percentage serviceable locomotives (Passenger).
11. Percentage serviceable freight cars.
12. Fuel consumption per 1000 gross ton-miles (Freight).
13. Fuel consumption per passenger-train car-mile (Passenger).

A technical index calculated from these factors, for the years 1922 to 1930, appears below. The tally commences with 1922, because that year immediately preceded the inauguration of the railways' program of increased efficiency in the spring of 1923. In this index, the annual average for the five years to 1924 is utilized as the base, or 100 per cent. The entry for 1930 is based on returns for the first ten months of the year.

Index of Efficiency (1920-1924=100)

1930	118.9
1929	121.1
1928	118.0
1927	115.2
1926	113.5
1925	109.4
1924	104.9
1923	103.4
1922	96.5

While a dip in the index occurred in 1930, yet that year was second only to 1929, and stood above all the other years of the nine-year period.

In reviewing the index for 1930, which showed a slight decline despite the general high level of railway performance in that year, we may properly consider

the effect of counting stored locomotives and surplus freight cars as a part of the equipment totals underlying four of the thirteen items in the foregoing list, namely, (Item 1) freight car-miles per car-day, (Item 2) net ton-miles per car-day, (Item 7) locomotive-miles per freight locomotive-day, and (Item 8) locomotive-miles per passenger locomotive-day.

Under normal business conditions, the inclusion of the stored and surplus equipment in the computation of these four averages works no particular hardship against the railways, because the number of units of surplus equipment runs along normal lines and no one year's index is disadvantaged thereby. When the numbers rise to such unprecedented levels as they did in 1930, the question arises whether they do not inflict too serious a handicap on the efficiency index, and whether some allowance should not be made for the surplus situation. Were such allowance made, the revised index would rise above that of 1929, and would measure another record-breaking performance.

For comparative purposes, however, and in the desire to make no artificial adjustments *in medias res,* the index is here presented, exactly on the basis of earlier years.

The extraordinary amount of surplus equipment on hand in 1930 is more fully discussed in the following section, dealing with the general topic of reserve equipment.

Reserve Equipment

Reduced traffic in 1930 had its definite effect on the amount of equipment held out of service, in reserve during the year, because of inadequate traffic demands. The reserve is measured by the number of stored locomotives and by the number of surplus or idle freight cars, which reached unusual peak levels throughout the greater portion of the year.

Table XII summarizes the reserve or surplus locomotive situation in 1930, 1929, and the five-year period to 1929, by months.

Table XII—Average Number of Stored Serviceable Locomotives (Freight, Passenger, and Switching)

	1930	1929	Average 1925-1929
January	6,203	6,264	5,604
February	5,985	5,322	5,282
March	6,218	5,199	5,512
April	7,279	5,877	6,208
May	7,198	5,647	6,292
June	7,614	5,641	6,316
July	8,043	5,413	6,253
August	8,282	5,210	6,083
September	8,113	4,886	5,678
October	7,808	4,253	4,947
November	7,555	4,268	4,674
December	...	5,444	5,287
Year	...	5,302	5,678

Save for January, the monthly average of stored locomotives in 1930 was greater than in any month of 1929, and every month showed a greater number than the corresponding five-year average. Combining the first eleven months of the year, the monthly average for 1930 was 7,300 locomotives in storage, 5,290 in 1929, and 5,713 during the five years.

This increase of more than 2,000 stored locomotives over 1929 supplies significant evidence of the extent to which surplus motive power was available in 1930. If any additional evidence be needed, it may be found in the fact that never had the number risen above 8,000 prior to 1930, whereas last year that number was exceeded during each of the three months of July, August, and September. Preliminary reports for December make it reasonably safe to say that that month also surpassed 8,000 locomotives in storage, and by a larger margin than in any preceding month.

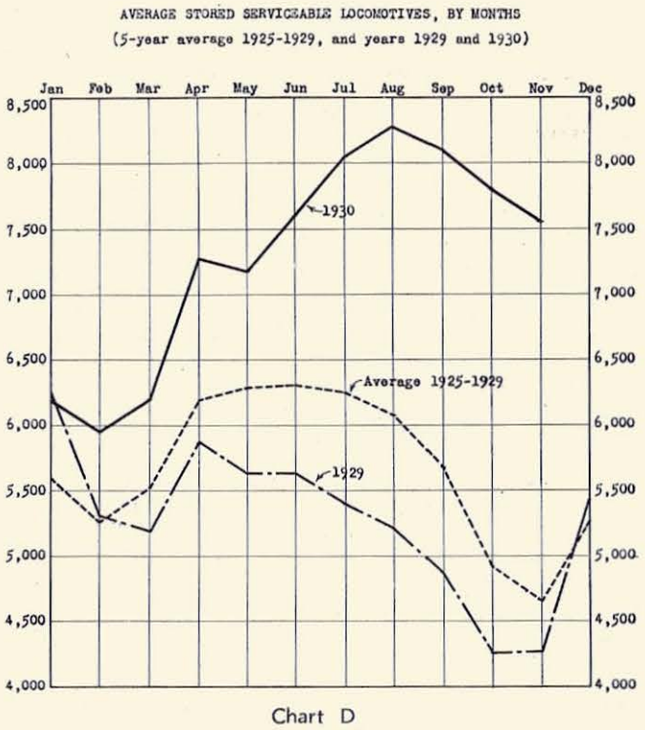


Chart D

Table XIII tells a similar story as to surplus freight cars in 1930, compared with 1929 and the five-year average, by months.

Table XIII—Average Daily Serviceable Freight Car Surplus

	1930	1929	Average 1925-1929
January	442,401	347,160	319,821
February	406,088	228,792	267,337
March	466,383	225,220	275,862
April	440,498	248,668	297,001
May	423,060	214,152	270,829
June	462,046	237,126	284,068
July	463,911	207,383	263,190
August	435,246	173,444	203,452
September	394,997	138,956	145,358
October	397,497	113,509	114,727
November	503,007	254,966	188,079
December	.....	392,273	301,299
Year	.....	231,804	244,460

During every month of 1930, the number of surplus freight cars greatly exceeded those of the corresponding months of 1929 and the five-year average. Toward the later months of the year, the surplus was from two to more than three times as great as it was in 1929, and in November surpassed 500,000, which was an unenviable record for the nine years since the beginning of 1922. Preliminary figures for December indicate that the all-time record was broken in that month, the number of surplus freight cars rising well above 600,000. This total was one-fourth of the total number of serviceable freight cars owned by the railways, which is eloquent of the traffic situation in that month.

Combining the first eleven months, the average monthly freight car surplus was 439,558 cars in 1930, 217,216 cars in 1929, and 239,066 cars for the average of the five years. This again reflects the decline in traffic in 1930, as measured in terms of freight cars ready to move but tied up for lack of demand, and also measures the tremendous surplusage of equipment in hand during 1930.

Car Shortage

An outstanding achievement of the year is the abolition of car shortage, the result of close co-operation between shippers and railways through the agency of the Shippers' Advisory Boards.

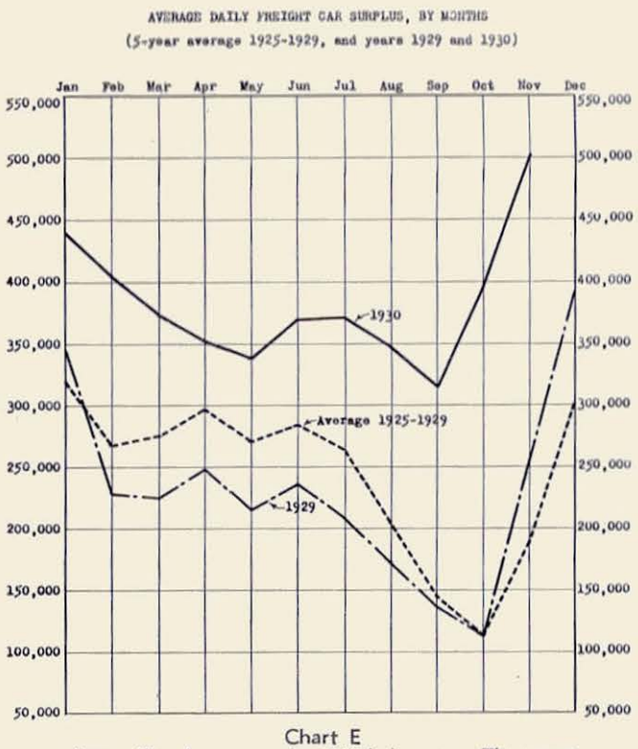


Chart E

Note: The above curve for 1930 is in error. The correct figures will be found in Table XIII

Year by year car shortages, which had been a cause of complaint by the public and of serious loss to shippers and the railways, have been reduced until in 1930 they virtually disappeared. Only one shortage of nine cars was reported during the year.

The average daily shortage in preceding years compares with that of 1930 as follows:

1930	0.2
1929	64
1928	42
1927	169
1926	286
1925	443
1924	1,047
1923	29,216
1922	47,882

The large car surpluses of 1930 had their helpful influence on the car-shortage situation. Even so, the abolition of the shortage evil marks an achievement in the way of effective and intelligent car-handling.

Physical Condition of Equipment

Table XIV indicates the proportion of locomotives (freight and passenger) and freight cars in good order and ready for service in 1930, compared with corresponding averages for 1929, by months.

Table XIV—Percentage of Serviceable Locomotives and Freight Cars

	Locomotives		Freight Cars	
	1930	1929	1930	1929
January	83.2	83.2	94.6	94.0
February	82.7	83.1	94.5	93.8
March	82.8	83.0	94.5	93.8
April	82.8	83.1	94.3	93.8
May	83.1	83.7	94.1	93.7
June	83.0	84.1	93.9	93.8
July	82.9	84.2	93.7	93.7
August	82.7	84.2	93.5	94.0
September	82.4	84.1	93.1	94.0
October	82.1	84.0	93.1	94.3
November	...	83.6	...	94.4
December	...	83.8	...	94.6
Year	...	83.7	...	94.0

The proportion of locomotives in good order, during the first ten months of 1930, averaged 82.8 per cent, compared with 83.7 per cent for the corresponding period of 1929. This recession in physical condition was unquestionably made necessary by the pressure to reduce maintenance expenditures, and also by the great excess reserve supply of locomotives on hand. The trend of the percentage ran slightly downward during the year.

In the case of freight cars, a downward tendency also occurred, from 94.6 per cent in January to 93.1 per cent in October. The ten-month average for both 1930 and 1929 was the same, however, standing at 93.9 per cent.

Freight Train Speed

The average speed of freight trains between terminals is a composite, depending in part on actual speed while in motion and in part on the reduction of delays in yards and on the road. This average has shown almost steady increase since 1922, and reached a new high mark in 1930, as indicated below:

	Train speed (miles per hour)
1930—ten months	13.7
1929—ten months	13.1
1929—year	13.2
1928	12.9
1927	12.3
1926	11.9
1925	11.8
1924	11.5
1923	10.9
1922	11.1

Freight Car Movement

Mileage per freight car per day reflects, among other things, the number of surplus freight cars. This grows out of the fact that all cars are counted in the basic totals underlying the average—whether the cars be out of order, idle, whether they are being loaded or unloaded by shippers in their free time, or what not. For this reason, the average daily movement of the average freight car, computed according to the standard statistics of the Interstate Commerce Commission, fell below that of 1929 and the five-year average. For the first ten months, the average was 29.3 miles per car per day in 1930, 32.8 miles in 1929, and 30.6 miles in the five years.

This comparison of freight car movement in 1930 and 1929 is not representative of actual operating efficiency, because (as already pointed out) the freight car surpluses went to such unprecedented levels in 1930. A more nearly accurate presentation eliminates idle or surplus cars from the average, and cars in bad physical condition as well, and measures the performance of active cars only. On this basis, the comparative position of 1930 improves mightily. The average movement per "active" (i.e., neither idle nor in bad order) freight car per day during the first ten months of 1930, computed as indicated, was 38.3 miles, compared with 38.5 miles during the corresponding period of 1929, and 37.9 miles for the year 1928. It will be recalled that 1929 established a new record in this respect.

As freight train speed set a higher average in 1930 than in any previous year, and as a freight car travels at the same rate of speed as the train of which it is a part, it is clear that freight cars while actually in motion were making excellent mileage in 1930. Average freight train speed in that year was 13.7 miles per hour, or 328.8 miles per day. Any freight car in movement for a continuous period of 24 hours also travelled 328.8 miles.

Locomotive Movement

Average locomotive movement per day in 1930, like average freight car movement, suffered greatly by reason of the large number of locomotives in storage during the year. A stored locomotive makes no mile-

age, yet is counted in the number on which the average mileage of the average locomotive is computed.

In the case of freight locomotives, daily movement during the first ten months of 1930 averaged 59.0 miles, compared with 65.6 miles in 1929. Passenger locomotive movement during the same periods averaged 117.2 miles per day in 1930, and 120.0 miles in 1929.

Reduced to an "active" basis, however, which excludes stored and unserviceable locomotives from the computation, the average movement for freight locomotives becomes 90.4 miles per day during the first ten months of 1930, compared with 91.6 miles per day for the corresponding period of 1929. The average movement for "active" passenger locomotives becomes 166.3 miles per day during the first ten months of 1930, and 164.4 miles per day in 1929. Combining the two classes of locomotives, the average "active" performance for 1930 stands slightly above that for 1929.

Average Train Load

Average freight train loading declined in 1930, as indicated by Table XV, which gives the figures for 1930, 1929, and the five-year average, by months.

Table XV—Net Tons Per Freight Train

	1930	1929	Average 1925-1929
January	756	769	738
February	782	779	754
March	761	777	757
April	771	776	745
May	793	813	783
June	799	827	784
July	798	818	789
August	835	855	821
September	817	856	822
October	813	843	816
November	...	771	778
December	...	755	740
Year	...	804	778

The average train load was below that of 1929 in nine of the first ten months of the year, but ran above the five-year average in eight of the same ten months. Taking the ten months as a whole, the average stood at 792 tons in 1930, 812 tons in 1929, and 782 tons during the five years.

Average Freight Car Load

With the exception of two months in 1930 (January and April) average tons per loaded freight car ran slightly below those of 1929. Compared with the five years, the average for 1930 was slightly down in every month except July, when it was the same. Table XVI tells the story in statistical form, by months.

Table XVI—Net Tons Per Loaded Car

	1930	1929	Average 1925-1929
January	27.6	27.5	27.7
February	27.0	27.3	27.2
March	25.6	25.8	26.4
April	25.7	25.6	25.9
May	26.3	26.6	26.7
June	26.6	26.7	26.8
July	27.1	27.3	27.1
August	27.4	27.5	27.6
September	26.8	27.1	27.0
October	26.4	26.9	26.8
November	...	27.2	27.4
December	...	28.0	27.8
Year	...	26.9	27.0

The average loading of the first ten months of the year was 26.6 tons per car in 1930, 26.8 tons per car in 1929, and 26.9 tons per car during the five years.

Earlier annual reviews have emphasized the fact that the amount of the load in the freight car is governed to a large extent by the will of the shipper, and to that degree is not an exact measure of railway performance. The operating factor in question is not included among the thirteen factors underlying our index of operating efficiency. The slight decline in 1930 was the result, in part at least, of the reduced traffic demand, which in many cases led to lighter loading of the individual car.

Net Ton-Miles Per Car-Day

Table XVII summarizes the net ton-miles per freight car per day, for the years 1930 and 1929, and five-year averages from 1925 to 1929, by months.

Table XVII—Net Ton-Miles per Car-Day

	1930	1929	Average 1925-1929
January	481	514	489
February	499	554	511
March	463	528	505
April	473	521	484
May	480	549	513
June	466	549	511
July	465	548	513
August	488	584	552
September	486	594	574
October	511	623	602
November	...	523	539
December	...	472	482
Year	...	547	524

Every month of 1930 fell below the corresponding month of 1929 and the five-year average. Averaging the first ten months of each period, the daily average was 481 ton-miles per freight car per day in 1930, 557 ton-miles in 1929, and 526 ton-miles during the five years.

Here again, the lowered demand for freight service in 1930 and the great increase in number of surplus cars, had their undoubted effect on the average daily performance of the freight car.

Gross Ton-Miles Per Train-Hour

Table XVIII is a summary of gross ton-miles per freight train per hour, showing the results for the several months of 1930, 1929, and the five-year average.

Table XVIII—Gross Ton-Miles per Freight Train Hour

	1930	1929	Average 1925-1929
January	23,163	22,556	20,048
February	24,887	22,904	20,706
March	25,216	24,060	21,453
April	25,761	24,383	21,765
May	26,328	25,269	22,793
June	26,587	25,583	22,749
July	26,388	25,202	22,820
August	26,922	25,398	22,889
September	26,826	25,582	22,848
October	26,937	25,254	22,788
November	.....	24,534	22,006
December	.....	23,627	21,091
Year	...	24,553	22,003

Owing principally to the increased speed of freight trains in 1930, this performance factor of gross ton-miles per train hour (excluding the weight of locomotive and tender) showed a considerable increase in that year, and broke all previous records. The monthly averages for 1930 ran consistently above 1929 and the five years, the cumulative results for the first ten months in the two years being as follows:

1930 ..... 25,869 G. T. M.
1929 ..... 24,625 G. T. M.

This was an increase in 1930 of 1,244 gross ton-miles per train hour, or 5.1 per cent.

A closely related performance factor is the average number of net ton-miles per train hour, which excludes the weight of the cars and covers only the freight in the train. This factor also broke all records in 1930, and its progress is outlined in Chart F.

Fuel Conservation

Two of the new performance records established by the railways during 1930 lay in the field of locomotive fuel consumption. Both in the freight and the pas-

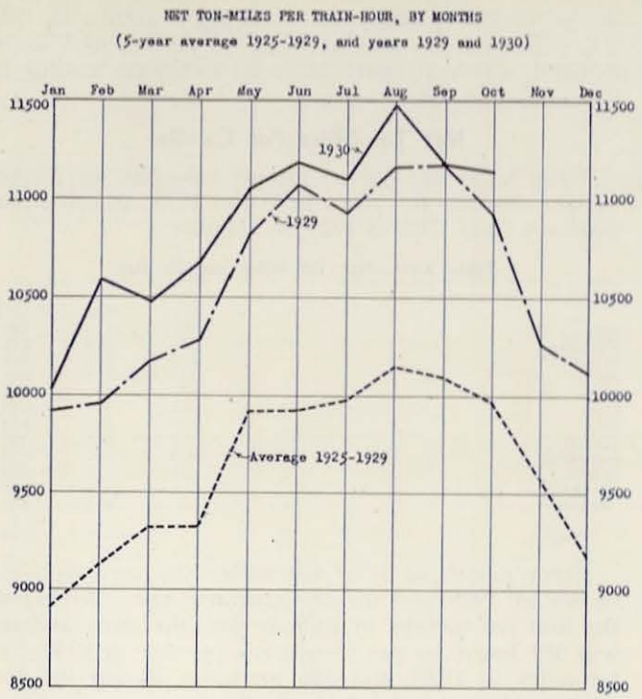


Chart F

senger service, records were established with respect to the economy of utilization.

Table XIX carries statistics of fuel consumption per unit in the two services, with a comparative showing for the several months of 1930 and 1929.

Table XIX—Pounds of Locomotive Fuel per Unit of Performance (Freight and Passenger Service)

	Lbs. per 1000 G.T.M. (Freight)		Lbs. per P.T.C.M. (Passenger)	
	1930	1929	1930	1929
January	142	144	16.8	16.8
February	131	143	15.8	16.7
March	129	131	15.4	15.5
April	121	124	14.6	14.6
May	115	119	14.0	14.3
June	112	114	13.6	13.7
July	109	113	13.4	13.5
August	109	112	13.5	13.4
September	111	116	13.7	13.9
October	117	121	14.5	14.7
November	...	131	...	15.3
December	...	139	...	16.0
Year	...	125	...	14.8

In the freight service, fuel consumption per 1000 gross ton-miles was lowered in each of the first ten months of 1930, compared with the corresponding months of 1929. The average for the ten months was 120 pounds per 1000 G. T. M. in 1930 and 123 pounds in 1929, a reduction (and improvement) of three pounds, or 2.4 per cent. The steady progress in this regard since 1922 is indicated below:

	Locomotive Fuel per 1000 G.T.M. (Inc. Loco. & Tender)
1930 (10 mos.)	120
1929	125
1928	127
1927	131
1926	137
1925	140
1924	149
1923	161
1922	163

In the passenger service, fuel consumption per passenger-train car-mile was lowered in seven of the first ten months of 1930, compared with the corresponding months of 1929; in two months it was the same as in 1929, and in one month (August) slightly greater. The average for the ten months was 14.5 pounds per P. T. C. M. in 1930 and 14.7 pounds in 1929, an improvement of 1.4 per cent.

Summary

While the railways faced many problems in 1930, growing out of the world-wide depression of that year, they also confronted a number of economic problems not related to the depression.

The greatest of these was the rising tide of competition from other agencies of transportation, which some have thought might eventually engulf the railway industry. Briefly stated, the growth in number and use of the private passenger automobile and the common carrier autobus has whittled down the passenger traffic to less than three-fifths of the volume of 1920. The private, contract, and common carrier motor truck operates in ever-widening zones of activity, and has brought an increasing element of freight competition into the picture. Additional elements are the growth of hydroelectric and other power plants, which indirectly tend to reduce coal consumption and coal movement by rail; rapid expansion in the pipe line industry, which has come to cover the piping of gasoline and natural gas, as well as the cruder oils; inland waterway development, fostered by large and increasing government appropriations for river and canal improvements and by direct public subsidies to the government barge line on the Mississippi and Warrior rivers.

These growing factors of competition are receiving specific recognition from many quarters. The Interstate Commerce Commission, in its annual report to Congress for 1930, pointed out that the recession in business was a factor in the year's operations, and then added:

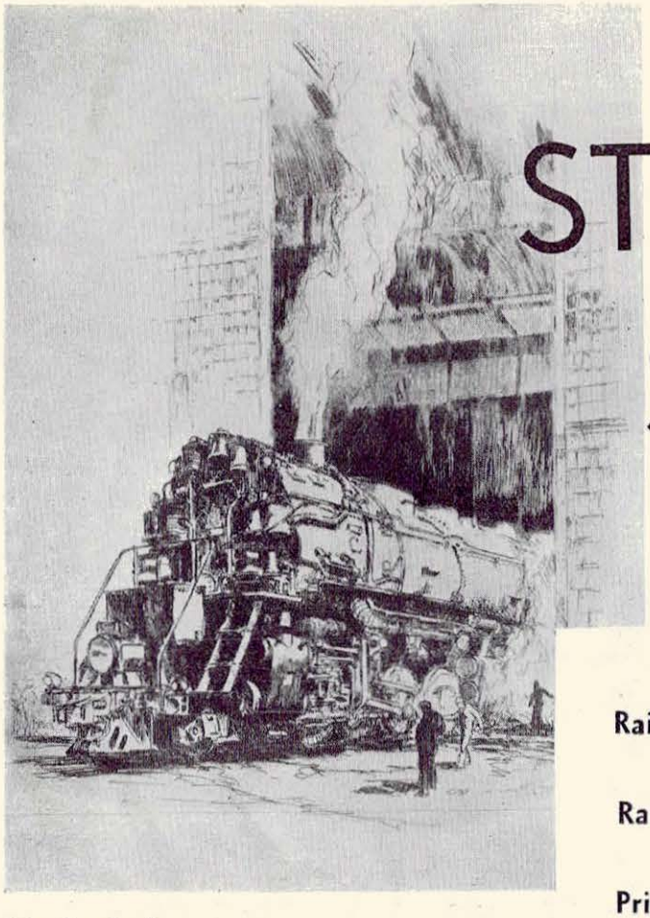
> But a different and more threatening financial difficulty confronts the railways. This is the effect of the competition of other forms of transportation. . . . The prospect of a continued expansion in freight business to offset the further loss in passenger business is darkened by the competition of water lines, pipe, and trucks, and by changes that may check the growth in demand for ton-mileage, such as economy in the use of coal, changes in the location of industry, and the relatively slower growth of population.

Many unofficial commentators have emphasized the increasingly serious competitive situation. The railways themselves, in a "declaration of policy" adopted by the Association of Railway Executives on November 20, listed some of the competitive factors underlying the lessening rate of growth in railway freight traffic. They urged that inequitable restrictions on the railways be removed, and that proper and comparable measures of regulation be applied to their competitors. The declaration further called on the government to withdraw from subsidized competition with the railways, and to give the carriers a respite from rate reductions and from enactments or regulations tending to affect their financial position to disadvantage.

The Commission during the late autumn inaugurated a series of hearings on the subject of coordination of rail and motor transportation, which were still under way at the close of 1930. In addition, its annual report recommended prompt passage of national legislation to regulate interstate motor bus traffic, to "furnish a nucleus of experience upon which to build for the future." The bus regulation bill before Congress, meanwhile, was making but slow progress.

Consolidation of railway companies into a few large systems has also been urged as one means of meeting the new conditions. The consolidation plan prepared by the Interstate Commerce Commission at the close of 1929

(Continued on page 102)



"The First Step"—
From a series of five etchings by O. Kuhler, published by the Schwartz Galleries, New York

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Tunnel at Grays Summitt, Mo., Placed in Service in 1930 by the Missouri Pacific

Railway Construction Increases in Volume

Expenditures largest since 1923—Mileage of new lines decreases—Larger mileage of new lines under construction and projected

By George E. Boyd

Associate Editor, Railway Age

THE record of another year of railway construction has been made, during which the widespread activities which have been so prominent a feature of railway development for nearly a decade, were in no wise abated. Contrary to popular belief, during 1930 the railways did not diminish their expenditures in this field. As a matter of fact they increased them. During the first nine months of the year, this being the latest date for which complete figures are available, the money spent for new equipment and for additions and betterments to their properties was greater than for the corresponding period of any year since 1923.

It is a matter of especial interest that $125,000,000 more was spent during this period than in the same period in 1929, and that the expenditure of more than $425,000,000 for improvements to roadway and structures was nearly $63,000,000 greater than last year. The mileage of new lines completed during the year was 513, as compared with 666 during 1929, a decrease of 153 miles or 26 per cent. This was less than for any year since 1924, but larger than for any year between 1919 and 1924. However, the mileage of lines now under construction or projected for 1931 forecasts a larger total for next year.

At the close of the year 590 miles of new line were under construction. Certificates were issued during the year by the Interstate Commerce Commission authorizing the construction of 1,275.94 miles, practically all of which were issued to established companies. In addition the commission authorized 327 miles in November and December, 1929. Four hundred fifteen miles of these lines are already under survey, 302 miles are now under construction and 64 miles have been completed, leaving 1,237 miles upon which actual construction has not yet been started.

The mileage of second, third and fourth track completed and placed in operation during the year, each exceeded the mileage of corresponding tracks for 1929. For a number of years there has been a steady decline in the mileage of multiple track construction, despite an equally steady increase in the volume of traffic handled.

This has been made possible primarily by the extensive installations of automatic signals, centralized control, interlockings, remotely controlled power switches, and other devices to speed up traffic, and by the use of heavier power, which have been made by many of the railways on their heavy traffic lines. When the limit of operating capacity has been reached, however, multiple tracks offer the only ultimate solution to the problem of increased capacity, so that the increased multiple track mileage placed in operation during 1930 is an indication that on some lines it was considered that the volume of traffic had reached a point where it was sufficient to warrant this more expensive solution of the problem of main-track capacity.

As in previous years, the major projects among the new lines fell into three classifications: Those which were built to furnish new traffic routes; those to provide shorter lines or easier grades along existing routes; and those which were projected to develop new territory or industrial centers.

Typical of the first classification was the extension by the Atchison, Topeka & Santa Fe, of the line of the former Kansas City, Mexico & Orient from Paisano, Tex., to Presidio, 65 miles, which not only provides a new route to the City of Mexico, but to the central sections of that country and which will eventually bring the Pacific ports on the west coast of Mexico, several hundred miles nearer to the eastern sections of the United States. Another project of this character is the new line, approximately 200 miles long, between Klamath Falls, Ore., and Keddie, Cal., which is being built by the Great Northern and the Western Pacific to provide a new route from the Northwest into San Francisco and from Oregon and Northern California points to the East.

Miles of New Line Completed in the United States Since 1893

1893	3,024	1912	2,997
1894	1,760	1913	3,071
1895	1,420	1914	1,532
1896	1,692	1915	933
1897	2,109	1916	1,098
1898	3,265	1917	979
1899	4,569	1918	721
1900	4,894	1919	686
1901	5,368	1920	314
1902	6,026	1921	475
1903	5,652	1922	324
1904	3,832	1923	427
1905	4,388	1924	579
1906	5,623	1925	644
1907	5,212	1926	1,005
1908	3,214	1927	779
1909	3,748	1928	1,025
1910	4,122	1929	666
1911	3,066	1930	513

The most prominent in the second class is the coordinated construction which is being carried out by the Chicago, Milwaukee, St. Paul & Pacific and the Chicago, Rock Island & Pacific, between Trenton, Mo., and Birmingham, to provide a joint line into Kansas City, of easy grades, light curvature, and less mileage.

Notable examples of lines constructed to develop new territory or to reach industrial centers include the Texas & Pacific line to Lovington, N. M., 73.5 miles; the 20-mile extension, in Oklahoma, of the Beaver, Meade & Englewood; the two lines in Oregon, aggregating 27 miles, completed by the Spokane, Portland & Seattle; and the extension by the Seaboard Air Line of the Prince George & Chesterfield, 16 miles, into Hopewell, Va.

Texas Maintains First Place in New Mileage

For the third consecutive year Texas led in the construction of new lines, the 245 miles which were completed in 1930 being 86 miles greater than the mileage completed in 1929, but 108 miles less than in 1928. New Mexico stepped into second place with 73.5 miles, displacing California which had slightly less than 10 miles in 1930. Oklahoma again ranked third with 27.5 miles, while Oregon was close behind with 27 miles.

At the close of the year approximately 590 miles of new road were under construction, a reduction of 40 miles as compared with the previous year, although the mileage of new lines projected, 1,237, was slightly greater than at the end of 1929. Among the larger projects of this character are two lines of the Gulf & West Texas, one from Fredericksburg, Tex., to Brady, 69 miles, and the other from San Angelo, Tex., to Eden, 44 miles; two lines of the Chicago, Rock Island & Pacific, one from Vega, Tex., to Forrest, 84 miles, and the other between Shamrock, Tex., and Beaver Creek, 113.5 miles; a line 115 miles long from Childress, Tex., to Pampa, which is projected by the Colorado & Southern; and the Texas-New Mexico, 70 miles.

These are only the more important examples of the projected new line construction. The complete list of authorizations for new lines issued by the Interstate Commerce Commission in 1930 is as follows:

Name of Road	Location of Line	Mileage Authorized
Algers, Winslow & Western	Pike County, Ind.	4.20
Atlantic Coast Line	Polk County, Fla.	7.00
Broward County Port Authority	Broward County, Fla.	3.50
Charleston & Western Carolina	Spartanburg County, S. C.	2.00
Chesapeake & Ohio	Raleigh County, W. Va.	19.20
Chicago & North Western	Gogebic County, Mich.	5.62
Chicago, Milwaukee, St. Paul & Pacific	Clay, Ray, and Caldwell Counties, Mo.	14.68
Chicago, Rock Island & Gulf	Oldham and Deaf Smith Counties, Tex.	50.00
	Wheeler, Collingsworth, Childress, Hardeman, Foard, and Wilbarger Counties, Tex.	108.00
Chicago, Rock Island & Pacific	Curry and Quay Counties, N. Mex.	26.00
Clackamas Eastern	Clackamas County, Ore.	4.00
Clinton-Oklahoma-Western	Gray County, Tex.	8.70
Dodge City & Cimarron Valley	Baca and Bent Counties, Colo.	83.00
Elkhart & Santa Fe	Cimarron County, Okla., and Union and Colfax Counties, N. Mex.	149.00
Fort Worth & Denver Northern	Childress, Collingsworth, Wheeler, and Gray Counties, Tex.	110.00
Great Northern	Klamath County, Ore. and Siskiyou, Modoc, and Lassen Counties, Calif.	87.50
Great Northern and Western Pacific	Modoc and Siskiyou Counties, Calif.	36.00
Gulf & West Texas	Gillespie, Mason, McCulloch, Concho and Tom Green Counties, Tex.	113.00
Inter-California	Imperial County, Calif.	5.80
Michigan Central and New York Central	Kent County, Mich.	2.95
New Orleans Public Belt	Orleans and Jefferson Parishes, La.	4.90
New York Central	New York City	4.50
	Onondaga County, N. Y.	6.40
Norfolk & Western	McDowell County, W. Va. and Tazewell County, Va.	8.00
Oneida & Western	Fentress County, Tenn.	9.00
Oregon Electric	Linn County, Ore.	68.60
Ozark & Philpott Valley	Franklin County, Ark.	7.00
Panhandle & Santa Fe	Potter, Moore, Sherman, and Dallman Counties, Tex.	98.00
Pittsburgh & Lake Erie	Beaver County, Pa.	3.50
Pittsburgh & West Virginia	Washington County, Pa.	6.00
Quanah, Acme & Pacific	Hardeman County, Tex.	5.00
St. Louis & Ohio River	St. Clair County, Ill.	17
St. Louis-San Francisco	Creek County, Okla.	2.95
St. Louis, San Francisco & Texas	Wilbarger and Baylor Counties, Tex.	42.00
St. Louis Southwestern	Craighead and Poinsett Counties, Ark.	15.50
Southern Pacific	Solano County, Calif.	.70
Sprucemont Nevada	Elko County, Nev.	23.50
Texas & New Orleans and Morgan's Louisiana & Texas	Lafourche Parish, La.	5.47
Texas Short Line Ry. Co.	Van Zandt County, Tex.	11.00
Toledo, Peoria & Western	Peoria County, Ill.	.60
Virginian	Fayette County, W. Va.	1.00
Western Pacific	Plumas and Lassen Counties, Calif.	112.00
Total number of miles		1,275.94

Mileage Decreased in Canada

The mileage of new lines completed in Canada showed a marked decrease in 1930 as compared with 1929, being 385 miles as compared with 841 miles in 1929 and 723 miles in 1928. It is greater, however, than in 1926 or

1927 when 335 miles and 310 miles respectively were completed, but with these exceptions it is the lowest since 1922, when only 145 miles were completed. As in recent years most of this mileage consisted of branch lines constructed for the purpose of developing those sections of Alberta and Saskatchewan which are adapted for agriculture. The major exception was the 45-mile extension of the main line of the Temiskaming & Northern Ontario, which is being pushed steadily toward tide water at the south end of James Bay, Ont. The construction of the remainder of the line necessary to do this is now under way and should be completed in the near future. The completion of this project will not only give the Dominion an additional route to Europe through Hudson Strait, but will also give access to the vast forest and mineral resources along the southerly and easterly sides of Hudson Bay and permit their development.

Miles of New Lines Completed in Canada Since 1904

1904	316	1917	207
1905	1,181	1918	135
1906	1,007	1919	433
1907	976	1920	305
1908	1,249	1921	252
1909	1,488	1922	145
1910	1,844	1923	655
1911	1,898	1924	615
1912	2,232	1925	414
1913	3,013	1926	335
1914	1,978	1927	310
1915	718	1928	723
1916	290	1929	841
		1930	385

Railway Construction in Mexico

Railway construction in Mexico, which has been practically at a standstill for several years owing to the political and economic conditions in that country, was in itself of minor importance, since only 66.5 miles of new road were completed and placed in operation, 46.7 miles of which was on the Calles-Guerrero line, thus completing the construction between these points. The important railway development of the year in Mexico, however, was the placing in operation of the plan for reorganizing the government-owned railways, the National Railways of Mexico, which comprise approximately 70 per cent of the existing mileage of the country. The benefits which are expected to accrue from this reorganization and the fact that both the finances and operation of this system have been placed in capable hands, should give a decided impetus to the plans which have already been made for the construction of lines to provide adequate transportation in sections of the country where it is badly needed.

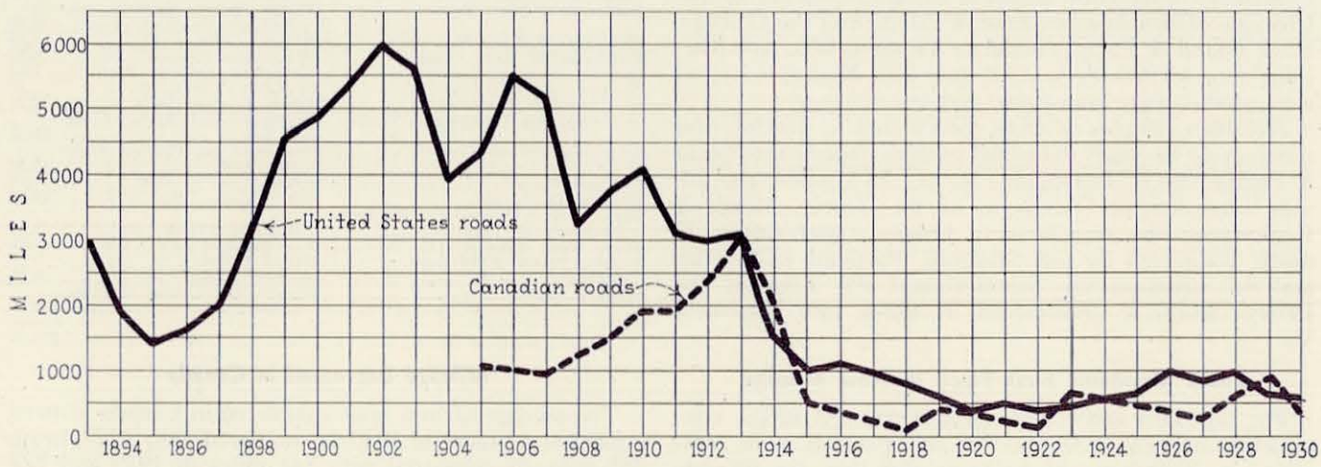
The large mileage of new lines which are already under survey or projected is given in detail in another column. In addition to these lines, the government has granted a concession for the construction of a line between Santa Lucrecia, V. C., where it will connect with the National Railways, and Campeche, Cam., the western terminus of the United Railways of Yucatan, about 528 miles. The terms of the concession, which also contemplates the construction of about 300 miles of branch lines, provide that the surveys shall be completed in two years, that construction shall be started within four months from that time, and that the entire construction shall be completed within 20 years from the date of the concession.

New Multiple Track Mileage

Not only was the total mileage of multiple track completed in 1930 greater than for the preceding year, but the mileage of second, third and fourth track each exceeded that for 1929. The amount of second track placed in operation was 236 miles as compared with 181 miles in 1929, an increase of 55 miles or 30 per cent. Likewise the third and fourth track was 71 miles and 24 miles respectively as compared with 40 miles of third track and 10 miles of fourth track in the previous year, the percentages of increase being 77 and 140 respectively. The longest single stretch of second track placed in operation was on the Southern between Danville, Ky., and Rogers Gap, 55 miles; the next longest being on the Cleveland, Cincinnati, Chicago & St. Louis between Whitestown, Ind., and Colfax 22.77 miles. The Atchison, Topeka & Santa Fe was only slightly behind with 22.4 miles of second track between Winslow, Ariz., and Joseph City.

New Track Built in 1930

United States	Number of companies building	First track	Second track	Third track	Fourth track	Total
Arizona	1	....	22.40	....	....	22.40
Arkansas	2	16.23	9.82	0.09	....	26.14
California	3	9.63	18.32	....	....	27.95
Colorado	1	....	2.08	....	....	2.08
Florida	2	9.03	....	....	....	9.03
Illinois	5	3.46	....	22.90	12.32	38.68
Indiana	2	....	41.81	....	....	41.81
Kentucky	3	16.46	55.00	1.28	....	72.74
Louisiana	1	18.89	....	....	....	18.89
Michigan	2	5.62	3.90	....	....	9.52
Mississippi	1	....	1.17	....	....	1.17
Missouri	1	....	18.26	....	....	18.26
Montana	1	5.84	....	....	....	5.84
New Mexico	1	73.48	....	....	....	73.48
New York	1	5.50	3.20	10.90	7.70	27.30
Ohio	4	14.28	17.55	4.49	....	36.32
Oklahoma	2	27.49	4.50	....	....	31.99
Oregon	1	27.00	....	....	....	27.00
Pennsylvania	3	9.87	2.51	1.84	1.87	16.09
Rhode Island	1	....	....	13.73	....	13.73
Texas	5	245.13	33.55	....	....	256.28
Utah	2	....	14.28	....	....	14.28
Virginia	2	19.94	3.33	....	....	23.27
West Virginia	2	5.66	7.00	16.08	2.22	30.96
Total United States		513.51	236.28	71.31	24.11	845.21



New Line Mileage Constructed in the United States and Canada

The Southern Pacific completed 14 miles in Utah, between Bridge and West Weber, while the Missouri Pacific placed nearly 12 miles of second main track in operation between Pacific, Mo., and Boles.

The Chicago & North Western completed its third tracking program between Chicago and Des Plaines during the year, placing 8 miles of third track in service, between Jefferson Park, Ill., and Des Plaines and an additional 15 miles beyond Des Plaines. The Cheapeake & Ohio completed 16 miles of third track between Barboursville, W. Va., and Kenova, and the New York, New Haven & Hartford completed 14 miles between Westerly, R. I., and Davisville. The New York Central completed 7.7 miles each of third and fourth track on its Hudson River division between Chelsea, N. Y., and Poughkeepsie, while the Chicago, Burlington & Quincy completed 12 miles of fourth track between Downers Grove, Ill., and Eola.

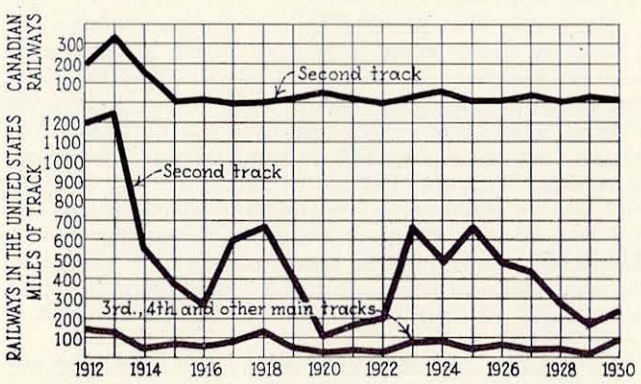
Miscellaneous Projects of Magnitude

The New York Central continued work on the West Side improvements in New York, the largest single project now under way in the country. This project involves an ultimate expenditure of $175,000,000 and calls for the elevation and relocation of its tracks on the west side of Manhattan Island, the elimination of 90 street crossings at grade and a large amount of miscellaneous construction. The next largest project is the electrification of the main line of the Pennsylvania between New York and Philadelphia, work on which has shown considerable progress during the year. This company has also continued work actively on its passenger terminal in Philadelphia, which will, when completed, have cost upwards of $60,000,000. The suburban facilities at West Philadelphia, which are a part of this development, were placed in operation during the year.

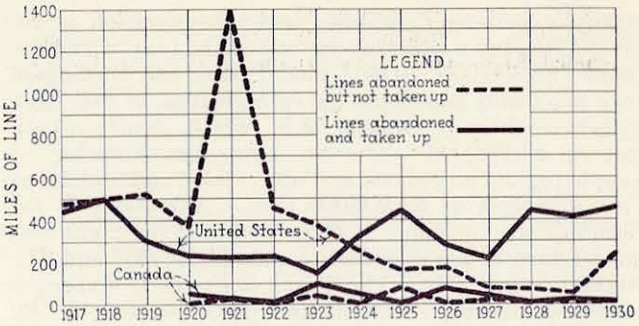
Another electrification project upon which rapid progress has been made during the year is that of the suburban lines of the Delaware, Lackawanna & Western in New Jersey, which was completed at the end of December, and which will be placed in full operation during the first weeks of the new year. The Reading has also made satisfactory progress in the electrification of its suburban lines out of Philadelphia. In addition to the electrification proper, this project includes an extensive grade crossing elimination program on the Chestnut Hill branch, and will cost $21,500,000.

The Illinois Central has continued the electrification of its tracks in its Chicago terminal, the progress during 1930 being confined to the freight tracks which were electrified as far south as Thirty-ninth street. The electrification of the freight tracks alone will require an ultimate expenditure of $4,500,000.

For several years the elimination of grade crossings


CANADIAN RAILWAYS
RAILWAYS IN THE UNITED STATES
MILES OF TRACK
Second track
Second track
3rd., 4th and other main tracks
1912 1914 1916 1918 1920 1922 1924 1926 1928 1930

Multiple Track Mileage Constructed in the United States and Canada


MILES OF LINE
LEGEND
Lines abandoned but not taken up
Lines abandoned and taken up
United States
Canada
1917 1918 1919 1920 1921 1922 1923 1924 1925 1926 1927 1928 1929 1930

Miles of Line Abandoned in the United States and Canada

has put a heavy burden upon the railways, 1930 being no exception. Among the larger undertakings of this character are included the track elevation now under construction by the Indianapolis Union Railway which will cost $13,000,000 when completed; the track elevation and depression for a distance of 4.5 miles through Milwaukee which the Chicago, Milwaukee, St. Paul & Pacific is carrying out at a cost of $4,000,000; a similar project by the Louisville & Nashville at Birmingham, Ala., which is estimated to cost $4,000,000; the Manayunk grade separation at Manayunk, Pa., by the Reading, $4,500,000; the Baltimore & Ohio track elevation at South Philadelphia, Pa., $4,400,000, and two other grade separations by this road, one on Staten Island, New York, $1,815,000, and the other at Baltimore, Md., $1,870,000; the joint track elevation at Newark, Ohio, by the Baltimore & Ohio and the Pennsylvania at a total cost of $1,980,000; the Central of New Jersey at Cranford, N. J., $2,300,000; the Norfolk & Western at Columbus, Ohio, $4,500,000; the Chicago, Milwaukee, St. Paul & Pacific at Evanston, Ill., $2,000,000; the Chicago & North Western at Kenosha, Wis., where a three year program is under way, $900,000 having been spent in 1930; the Chicago, Rock Island & Pacific which has grade separations under way at various points on its system which total $1,413,000; and the Southern, which has three major projects which involve a cost of $1,848,000. In addition to street and highway separations the railway grade crossings at Fifteenth and Canal streets, Chicago, which involve four roads, are being eliminated at a cost of $15,000,000. The Chicago, Rock Island & Pacific is also elevating its tracks through Joliet, Ill., in connection with the Illinois Deep Waterway project, at a cost of $1,413,000.

These are only the projects of greatest magnitude. Other crossing eliminations are being carried out in increasingly large numbers, as is shown in detail in another column. These range in magnitude from that of the Kentucky & Indiana Terminal at Louisville, Ky., which is estimated to cost $700,000, to the great number which are in progress in the smaller cities and towns, and at isolated, but important, country highways.

Passenger Facilities

Large expenditures were made for the improvement of passenger facilities despite the constant decrease in passenger earnings. The major projects of this character included the Cleveland Union Terminal which was placed in operation late in June and which cost more than $80,000,000; work was continued on the Cincinnati Union Terminal, the ultimate cost of which will be $41,000,000; the Pennsylvania continued its progress on its $60,000,000 Philadelphia passenger terminal, placing the suburban facilities at West Philadelphia in service during the year. This road also has improved passenger facilities under construction at Newark, N. J., which are expected to cost $15,000,000. The Illinois Terminal has

extensive passenger facilities under construction at St. Louis, Mo., upon which at the end of the year, it had expended $3,400,000. The Union Pacific and Burlington have practically completed the co-ordination of their passenger facilities at Omaha, Neb., which involve a total cost of $4,178,000. The St. Louis-San Francisco is completing union stations at Tulsa, Okla., and Oklahoma City, at a cost of $2,500,000 each. Alterations in the Grand Central terminal at New York and the South station at Boston are expected to cost $1,805,000 and $1,800,000 respectively. The Texas & Pacific is erecting a combined passenger station and office building at Ft. Worth, Tex., at a cost of $1,500,000, while the Norfolk & Western is spending $1,090,000 at Portsmouth, Ohio, for a new passenger station and the improvement of its incidental facilities. The Southern Pacific has erected a new station at Stockton, Cal., at a cost of $550,000 and the Nashville, Chattanooga & St. Louis completed its Atlanta, Ga., terminal at a cost of $577,000.

In addition to these direct expenditures for passenger stations, the New York, Chicago & St. Louis is completing an expenditure of $19,000,000 to connect with the Cleveland Union Terminal, while the New York Central and Cleveland, Cincinnati, Chicago & St. Louis have spent $7,000,000 and $6,750,000 respectively for the same purpose and such incidental construction as is necessary to the main project. Similarly, the Chicago, Rock Island & Pacific revised its alinement at Oklahoma City to reach the new union station at that point, expending $1,904,000 for this purpose.

Freight Handling Facilities

Freight-handling facilities of various types also called for large expenditures during the year, the most important projects of this character being the Pennsylvania's pier and warehouse, Jersey City, N. J., $6,750,000; the 12-story terminal commerce building under construction at Philadelphia, Pa., by the Reading, $4,680,000; the produce terminal and hold yard, Pittsburgh, Pa., by the Pennsylvania, $3,273,000; a warehouse and mart, Terminal Railroad Association, St. Louis, Mo., $3,000,000; a new coal-handling pier which is being constructed by the Chesapeake & Ohio at Newport News, Va., $2,210,000; the new produce terminal of the Baltimore & Ohio, at Baltimore, Md., $1,200,000; new freight facilities the Chicago & North Western is constructing in connection with the Merchandise Mart, at Chicago, $1,644,000; various freight-handling facilities at New York, New York Central, $3,692,000; three freight piers at Portland, Me., Maine Central, $1,750,000; inbound freight house and warehouse, Texas & Pacific, Ft. Worth, Tex., $1,800,000; and the Railway Express building which the Chicago & North Western is constructing at Chicago at a cost of $3,900,000. In addition to these projects five railways in the west and southwest constructed new grain elevators or enlarged existing grain-handling facilities at a cost of $5,937,000.

Large sums were also involved in extensions and improvements to freight yards. The Chesapeake & Ohio either completed or made progress on yard facilities of

Lines Abandoned in the United States and Canada

	Lines abandoned and taken up Miles	Lines abandoned but not yet taken up Miles
United States		
Albany Port Terminal Railroad		
Waterloo Island, N. Y. to Albany	0.01	
Atchison, Topeka & Santa Fe		
Harper, Kan., to Anthony	7.77	
Bristol Railroad		
Bristol, Vt., to New Haven Jct.	6.00	
Cairo, Truman & Southern		
Poinsett and Cross Counties, Ark.		11.00
Cement, Tolenas & Tidewater		
Cement, Cal., to Tolenas		1.95
Chesapeake & Ohio		
Penniman, Va., to Penniman Jct.		4.68
Chesapeake Western		
Mt. Solon, Va., to North River Gap	4.00	
Chicago & Illinois Midland		
De Pue, Ill., to Princeton		13.30
Chicago & North Western		
Cortland, Ill., to Sycamore	4.64	
Robbins, Mich.	0.33	
Girard Jct., Ill.		2.32
Boone, Ia., to Ogden (Via Moingona)		10.28
Chicago, Burlington & Quincy		
Englewood, S. D., to Calcite	41.94	
Chicago, Milwaukee, St. Paul & Pacific		
Kirkland, Ill., to Camp Grant	15.14	
Springfield, S. D., to Running Water	6.55	
Worthington, Ia., to Farley	6.87	
Chicago, Rock Island & Pacific		
At Oklahoma City, Okla.		6.72
Chicago, St. Paul, Minneapolis & Omaha		
Emerald, Wis., to Woodville	9.62	
Chicora & Northwestern		
Chicora, Miss., to Clara	8.90	
Cimarron & Northwestern		
Cimarron, N. M., to Ponil Park	17.50	
Colorado & Wyoming		
Sopris, Colo., to Piedmont Mine	0.58	
Detroit & Mackinac		
Rose City, Mich., to National City	31.22	
Detroit, Toledo & Ironton		
Durban, Mich., to Dundee	5.08	
Petersburg, Mich., to Dundee	0.49	
Jackson, Ohio, to Cornelia	16.22	
Fonda, Johnstown & Gloversville		
Northville, N. Y., to Broadalbin Jct.	12.20	
Gloversville, N. Y., to Johnstown	3.50	
Georgia & Florida		
Garfield, Ga., to Millen		14.10
Graymont, Ga., to Pendleton Jct.		22.50
Gulf, Mobile & Northern		
Covington, La., to Folsom		12.20
Illinois Central		
Webb, Miss., to Parchman	11.68	
Helm, Miss., to Jacobs		12.50
Lake Providence, Texarkana & Western		
Tensas, La., to Dark Swamp		7.00
Louisiana & Arkansas		
Aloha, La., to Clinchfield Quarry	24.92	
Louisville & Nashville		
Arlo, Ala., to Docray	1.99	
Macomb, Industry & Littleton		
Macomb, Ill., to Littleton	19.96	
Manila & South Western		
Lunsford, Ark., to Bellefield	6.00	
Mineral Point & Northern		
Highland, Wis., to Highland Jct.	26.40	
Mississippi Southern		
Harrietville, Miss., to Kiln	30.00	
Harrietville, Miss., to Hines Jct.		19.6
Missouri Pacific		
Tioga, La., to Camp Beauregard	0.98	
Luna, Ark., to Lake Village		6.27
Monongahela		
Dearth Jct., Pa., to Low Phos Works	0.21	
Montour		
Lewis Run branch	2.41	
Mt. Tamalpais & Muir Woods		
Mill Valley Cal., to summit of mountain	8.49	
Mesa, Cal., to Muir Woods	2.88	
Northwestern Pacific		
Point Reyes, Cal., to Monte Rio	36.48	
Oklahoma Southwestern		
Bristow, Okla., to Nuyaka	23.25	
Rock Creek spur	3.24	
Chicken Creek spur	2.26	
At Bristow, Okla.		0.60
Pennsylvania		
In Philadelphia, Pa.	1.23	
At West Philadelphia, Pa.		0.55
White, Pa., to Saltsburg	0.55	
Reading		
At various points in Pennsylvania	1.67	
Rutland, Toluca & Northern		
Rutland, Ill., to Toluca		6.00
St. Louis-San Francisco		
Bloomfield, Mo., to Campbell	33.58	
Aquilla, Mo., to Brownwood	9.82	
Seaboard Air Line		
Hesperides, Fla., to Noloca	14.51	
Southern Pacific		
Albany, Ore., to Shelburn	14.71	
Bertha, Ore., to Portland	3.95	
Forest Grove loop, Ore.	3.07	
Hillsboro loop, Ore.	1.71	
Newberg loop, Ore.	1.08	
Union Pacific		
Oregon-Washington Railroad & Navigation Co.		
Megler, Wash., to Nahcotta		26.84
Ilwaco, Wash., to Ilwaco Jct.		1.09
Wrightsville & Tennile		
Wadley Southern		
Kite, Ga., to Creek Junction		14.00
Collins, Ga., to Swainsboro		33.00
Total	460.77	233.40
Canada		
Great Northern		
Grand Forks, B. C., to Weston, B. C.	2.57	

which the ultimate cost will be $4,141,000; the Burlington is adding to its freight terminal at Galesburg, Ill., at a cost of $3,000,000; the New York, Chicago & St. Louis is constructing yards at Cleveland, Ohio, which will cost $3,500,000; the alterations and additions to Mott Haven yard at New York will cost the New York Central $3,685,000; the Pennsylvania is constructing a yard at South Philadelphia, Pa., to cost $2,640,000; the Union Pacific has started the construction of a new yard at Cheyenne, Wyo., which is estimated to cost $1,886,000; while a large number of smaller but important projects of this character increase the total by several millions of dollars.

Shops and Engine Terminals

Among the larger construction projects which were completed during the year or are in progress, shops and engine terminals occupy a prominent place. The Chesapeake & Ohio completed its large shop program at Huntington, W. Va., and Russell, Ky., at a total expenditure of $6,818,000; while a large number of smaller improvements on other roads total approximately $2,000,000. Engine terminals to the number of eight major projects which were completed or in progress involved an expenditure of $4,866,000, besides a number of smaller improvements totaling more than $1,000,000.

Bridges

The largest bridge project completed during the year was the Suisun Bay bridge which the Southern Pacific opened to traffic and which cost $12,000,000. The Pennsylvania completed two bridges across the Hackensack river at Marion, N. J., at a cost of $8,000,000 and another across the Allegheny river at South Oil City, Pa., at a cost of $1,388,000. The Wabash has under construction at St. Charles, Mo., a bridge across the Missouri river which is estimated to cost $5,500,000, while the Missouri-Kansas-Texas completed the foundations for a similar structure across this stream at Boonville, Mo.

The Toledo Terminal completed its $1,300,000 bridge over the Maumee river at Toledo, Ohio. The Illinois Central removed its St. Charles Air Line bridge over the Chicago river to a position across the new channel at a cost of $500,000 while the Baltimore & Ohio completed its new bascule bridge over the new channel of this river, spending $1,300,000 for this purpose and other incidental items in connection with the straightening of this river. Other bridge construction of magnitude, not including structures on new lines, was completed or in progress during the year which involved a total expenditure of approximately $12,000,000.

During 1930, eight tunnel projects were under way, only one of which was completed, this being the conversion of the Ona tunnel at Ona, W. Va., into an open cut, by the Chesapeake & Ohio, at a cost of $713,000. This road has four major tunnel projects under contruction at Jerry's Run, Va., Allegheny, Va., Talcott, W. Va., and Stretchers Neck, W. Va., the total cost of which will be $7,357,000, other projects bringing the total cost of work now in progress to $8,185,000.

Water supply development and improvements of considerable magnitude were under way or completed, by four railways. The Illinois Central extended a pipe line from the Chicago city limits to Markham yard at a cost of $111,500. The New York Central has under way the installation of seven water treating plants on its main line west of Buffalo, which will cost $487,800 when completed, one plant now being in service. The Southern Pacific laid long lines of cast iron pipe at Imlay, Nev., and Montello to increase its available supply of water and constructed a 90-ft. rock-filled dam at Bonito Creek, N. M., to impound a supply of 332,000,000 gal. In addition, this road installed water-treating equipment at 19 water stations in Texas. The total cost of these improvements was $1,103,000. The Texas & Pacific continued its program of water supply development on the western section of its road by completing a pipe line 37 miles long near Toyah, Tex., at a cost of $500,000.

Increase in Mileage of Abandoned Lines

There was an increase of 238 miles in the lines abandoned in the United States, the total for the year being 694 miles which is 181 miles in excess of the mileage of new lines completed during the year. This compares with a net increase of 91 miles of main track in 1929 and 513 miles in 1928. The largest abandonment during the year was that of the Mississippi Southern which discontinued the operation of its entire railroad, 49.6 miles. The Chicago, Burlington & Quincy came next with 42 miles of line between Englewood, S. D., and Calcite, although the St. Louis-San Francisco abandoned slightly more than 43 miles at two separate points. The Northwestern Pacific was next with 36.5 miles in one stretch between Point Reyes, Cal., and Monte Rio, while the Georgia & Florida abandoned a total of 36.6 miles at two separated point.

Railway Construction in the United States in 1930

Alaska Railroad

Important Work Undertaken: Raising and widening embankments, 26 miles, $125,300 (56 per cent completed).

Albany Port District Terminal Railroad

First Track: At Waterloo Island, Albany, N. Y., 3.9 miles. At Rensselaer, N. Y. 1.6 miles.
Second Track: At Waterloo Island, Albany, N. Y., 2.2 miles. At Rensselaer, N. Y., 1 mile.
Third Track: At Waterloo Island, Albany, N. Y., 2.2 miles. At Rensselaer, N. Y., 1 mile.
Important Work Undertaken: New lines under construction, first, second and third tracks at Albany, N. Y., and Rensselaer, $225,000 (completed).
Important Work Projected: Railway connections to car-ferry floats at Albany and Rensselaer, 1 mile.

Atchison, Topeka & Santa Fe

First Track: (Gulf Colorado & Santa Fe) Cane Jct., Tex., to Sena Jct., 18 miles.
(Pan Handle & Santa Fe) San Angelo, Tex., to Sonora, 64.95 miles. Paisano, Tex., to Presidio, 72.44 miles.
Second Track: Joseph City, Ariz., to Winslow, 22.4 miles. High Grove, Cal., to Riverside, 2.85 miles.
Important Work Undertaken: Renewal of Bridge 1124 and installation of bascule lift span over Middle river, Valley division, Woodsbro, Cal., (completed). New freight and passenger stations, additional yard facilities, subways and viaducts, Streator, Ill., (completed). Renewal of Bridge 116-D and viaduct over state highway, La Rose, Ill., (10 per cent completed). Renew and raise Bridge 128-A over Illinois river and revise alinement, Chillicothe, Ill., (25 per cent completed). Renewal of bridge 323-B, Elmer, Mo., (20 per cent completed). Rearrangement of crossovers and installation of remote control switches for reversal of traffic, Holliday, Kan., to Olathe, (20 per cent completed). Apprentice school and fire department buildings, Topeka, Kan. (completed). Construction of timber-treating plant, Wellington, Kan., (80 per cent completed). New station and Harvey House, Newton, Kan. (completed). Renewal of Bridge 451.1, over north fork of Red river, Lugert, Okla., (completed). Renewal of Bridge 1006-A over Rio Grande river, San Marcial, N. M., (completed). Renewal and extension of Bridge C-34, Albuquerque division (completed). Changes in yard, Winslow, Ariz., (completed). New station and Harvey House, Winslow (completed). Grade separation, Los Angeles, Cal., (20 per cent completed). Additional yard tracks, Hobart, Cal. (completed).
(Gulf Colorado & Santa Fe). New freight station facilities, Dallas, Tex., (completed). New storehouse, Cleburn, Tex., (completed). New road under construction, Sena Jct., Tex., to Thompson, 15.9 miles.
(Panhandle & Santa Fe). New road under construction, Heaton, Tex., to Lefors, 8.6 miles. Amarillo, Tex., to Boise City, Okla., 121.5 miles. Renewal of Bridge 480.0 over Red river, Elmer, Okla., (completed). Renewal of Bridge 688.1 over Colorado river, Beverly, Tex., (completed). New yard facilities, San Angelo, Tex., (completed).

Atlanta & West Point

Important Work Undertaken: (Western Railway of Alabama) Riverbank protection, Ft. Decatur, Ala., $125,000 (completed).

Atlantic Coast Line

First Track: Medulla, Fla., to Ridgewood, 6.72 miles.

Baltimore & Ohio

Second Track: North Lima, Ohio, to Toledo, 1.25 miles. Bates, Ohio, to Roachton, 6.70 miles. "DA" tower, Ohio, to Tower "Q," 1.0 miles.
Third Track: East Columbus, Ohio, to N. & W. crossing, 2. 2 miles.
Important Work Undertaken: Spur to plant of Gulf Refining Company, Gulfport, Staten Island, N. Y., $440,000 (99 per cent completed). Elimination of grade crossing, Bay street, Clifton, Staten Island, $1,205,000 (2 per cent completed). Elimination of grade crossing, Tompkins avenue, Clifton, S. I., $425,000 (completed). Bridge to carry new street over railway, Lorraine avenue, Clifton, S. I., $185,000 (completed). Elimination of grade crossing, Egard road, Linden, N. J., $120,000 (completed). Changing alinement and elevating tracks through South Philadelphia, Pa., $4,400,000 (85 per cent completed). Grade crossing elimination, Hanover street, and relocation of Locust Point Branch, Baltimore, Md., $1,870,000 (completed).
Additional pier facilities and pier shed, Pier 7, Locust Point, Baltimore, Md., $275,000 (completed). Improvement and additions to Pier 6, Locust Point, Baltimore, $375,000 (completed). Marley Neck branch, new industrial branch, 2.67 miles long, Baltimore, $1,530,000 (98 per cent completed). Produce-handling facilities, warehouse and team tracks, Baltimore, $1,200,000 (completed).
Grade crossing elimination, Hyattsville, Md., $269,600 (completed). Grade crossing elimination, Gaithersburg, Md., $200,000 (90 per cent completed). Elimination of grade crossing, Relay, Md., $150,000 (95 per cent completed). Elimination of grade crossing, Ridgeville, Md., $250,000 (completed). Relocation of line, new bridge over Potomac river and changes in tunnel, Harpers Ferry, W. Va., $800,000 (35 per cent completed). Separation of grades, Kearneysville, W. Va., $210,000 (25 per cent completed). Enlarging passenger, freight and yard facilities at new location, Johnstown, Pa., $365,000 (30 per cent completed). Construction of float bridge and car dumper, Glenwood, Pa., $217,000 (40 per cent completed). Elimination of Second Avenue grade crossing, revision of grade and additional tracks, Pittsburgh, Pa., $556,000 (50 per cent completed). Construction of freight house and driveways, Pittsburgh, $274,000 (completed). Elimination of grade crossing, Division street, Youngstown, Ohio, $283,500 (completed). Relocation of C. T. & V. branch, municipal airport, Akron, Ohio, $149,000 (95 per cent completed). New coal-storage yard and drawbridge over Grand river, Fairport, Ohio, $364,000 (completed). Elimination of four grade crossings, Group 1, Akron, Ohio, joint with Pennsylvania, B. & O. proportion, $271,000 (completed). Elimination of grade crossing East Thornton street, first unit of Group 2, Akron, joint with Pennsylvania, B. & O. proportion, $125,000 (30 per cent completed).
Relocation of tracks and construction of bascule bridge over Chicago river, account of river straightening, Chicago, $1,300,000 (80 per cent completed). Track elevation between Seventy-ninth street and Western avenue, Chicago, $282,000 (95 per cent completed).
Grade separation Fifteenth street and Stewart avenue, Chicago, B. & O. Proportion, $1,085,000 (30 per cent completed). Track elevation Western avenue to Eighty-third street, Chicago (95 per cent completed). Track elevation, Seventy-ninth street, Chicago, $245,000 (95 per cent completed). Track elevation, Eighty-third street, Chicago, $136,000 (90 per cent completed). Reconstruction of Bridge 77, Keyser, W. Va., $200,000 (completed). Renewal of Bridge 78, Keyser, W. Va., $110,000 (46 per cent completed). Renewal of bridge over upper Potomac river, Keyser, W. Va., $265,000 (completed).
Elimination of grade crossing, Limestone, W. Va., $140,000 (completed). New freight house and incidental facilities, Spring Grove avenue, Cincinnati, Ohio, $349,000 (completed). Additional tracks and rearrangement of switches, West yard, Hamilton, Ohio, $223,000 (85 per cent completed). Elimination of grade crossings between Second street and Miami river, Dayton, Ohio, joint with city and other roads, B. & O. proportion, $2,671,000 (60 per cent completed). Reconstruction of Bridge 152 over Nelson road, Columbus, Ohio, $136,000 (completed). Installation of double slip switches and rearranging tracks. Fourth and Leonard avenues, Columbus, Ohio, $106,000 (completed).
Elimination of grade crossings, Newark, Ohio, joint with city and Pennsylvania, B. & O. proportion, $499,500 (completed). Separation of grades, Skillman avenue, Glendale, Ohio, $105,000 (80 per cent completed). New freight yard, Indianapolis, Ind., $163,000 (completed). Track changes, construction of 1.25 miles of second track, extending passing sidings, rearranging switches and installing automatic signals, North Lima, Ohio to Toledo, $1,128,000 (completed). Strengthening bridges, constructing second track, sidings and storage tracks, enlarging engine-houses, installing heavier turntables, improving signals, etc. Fairmont, W. Va., to Lorain, Ohio, $3,540,000 (75 per cent completed).

Bangor & Aroostook

Important Work Undertaken: Reconstruction and strengthening of various bridges on system, $134,000 (completed).

Beaver, Meade & Englewood

First Track: Hough, Okla., to Eva, 20.4 miles.
Important Work Undertaken: New road under construction, Eva, Okla., to Keyes, 20 miles, $400,000 (30 per cent completed).
Important Work Projected: New road from Keyes, Okla., to Des Moines, N. M., 97 miles.

Bellefonte Central

First Track: State College, Pa., to Fairbrook, 5.4 miles.

Belt Railway of Chicago

Important Work Undertaken: Track elevation between Ninety-third and Ninety-fifth streets, Chicago, from Indiana avenue to Colfax avenue, $4,675,000 (completed).

Bessemer & Lake Erie

Important Work Undertaken: Revision of alinement, Coolspring, Pa., to Fredonia, $266,000 (70 per cent completed).

Bingham & Garfield

Important Work Undertaken: New loaded and empty yards at coal dumper, Arthur, Utah, $120,000 (completed).

Birmingham Southern

Important Work Undertaken: Extension of classification yard, Fairfield, Ala., $250,000 (completed). Grade separation, rearrangement of yard tracks and foreign connections, Birmingham, Ala., $170,000 (completed).

Boston & Maine

Important Work Undertaken: Reconstruction and strengthening of bridges at various points on system $1,941,400 (completed).

Canadian National (Lines in U. S.)

Dequindre grade separation, involving 22 streets, Detroit, Mich. (to be completed in 1933). Extension of belt line, 6.63 miles Pontiac, Mich. (to be completed in 1931). Relocation of 9.1 miles of tracks account of widening Woodward Avenue, Detroit, Mich. (completion indefinite). Construction of new ferry slips, Muskegon, Mich. (to be completed in 1931). Construction of nine team tracks and office building, Detroit, Mich., (completed). Construction of new engine terminal, Pontiac, Mich. (completed). Elimination of grade crossings, South Bend, Ind. (completed). Track elevation, Chicago, (completed). Freight house and extension to stores department building, Battle Creek, Mich. (completed).

Central Railroad of New Jersey

Important Work Undertaken: Grade crossing elimination, Cranford, N. J., $2,300,000 (completed).

Chesapeake & Ohio

First Track: Marshall, W. Va., to Beech Glen, 5.66 miles.
Third Track: Barboursville, W. Va., to Kenova, 16.08 miles. Big Sandy Junction, Ky., to Cliffeside, 1.28 miles.
Fourth Track: Through Huntington, W. Va., 2.22 miles.
Important Work Undertaken: New road under construction, Millard, Ky., to Kentucky-Virginia State line, 28 miles, $4,804,000. New road under construction Edwright, W. Va., to Surveyor, 19.5 miles, $2,377,500. Construction of new coal pier, Newport News, Va., $2,210,000 (33 per cent completed). Construction of five additional storage warehouses, Newport News, $151,400 (completed). Extension of passing siding and rearrangement of water station facilities, Buchanan, Va., $101,000 (40 per cent completed). Improvements to locomotive shops, Clifton Forge, Va., $153,500 (55 per cent completed). Engine terminal improvements, Clifton Forge, $705,000 (completed).
Construction of a new single-track tunnel parallel to Lewis tunnel, Jerrys Run, Va., $1,096,000 (10 per cent completed). Construction of new single-track tunnel to parallel Allegheny tunnel, and line a portion of Allegheny tunnel, Allegheny, Va., $1,666,000 (12 per cent completed). Enlargement of White Sulphur tunnel, White Sulphur, W. Va., $118,500 (3 per cent completed). Construction of new passenger station and car-parking tracks, White Sulphur, $166,700 (completed). Construction of new single-track tunnel to parallel Big Bend tunnel, between Talcott, W. Va., and Hilldale, $2,471,000 (9 per cent completed). Enlargement of Stretcher's Neck tunnel for double track and revise gradients, Prince, W. Va., $1,124,000 (1 per cent completed).
Construction of light repair yard and buildings, Hinton, W. Va., $214,800 (completed). Reconstruction of locomotive shops, Huntington, W. Va., $3,633,400 (completed). Two highway bridges over Big Sandy river and C. & O. tracks, and rearrangement and extension of station, Prestonburg, Ky., C. & O. proportion $151,400 (80 per cent completed). Construction of new freight car shops, Russell, Ky., $3,165,000 (completed). Extension to westbound classification yard, Russell, $583,000 (35 per cent completed).
Rebuilding old Ohio River bridge to adapt it for highway use, Covington, Ky.,-Cincinnati, Ohio, $923,200 (98 per cent completed). Construction of 1,000,000-bu. annex to grain Elevator A., South Chicago, Ill., $344,500 (completed). Elimination of grade crossing, Dennison avenue, Columbus, Ohio, $272,300 (95 per cent completed). Construction of new southbound yard, Walbridge, Ohio, $830,000 (completed).
Engine terminal improvements, Fulton, Va., $747,000 (completed). Extension of five tracks in westbound yard, Clifton Forge, Va., $302,000 (completed). Strengthening 11 bridges, Greenbrier subdivision, $253,000 (completed). Engine terminal improvements, Hinton, W. Va., $363,000 (completed). Relocation of main tracks and extension of four tracks in westbound yard, Hinton, W. Va., $632,400 (completed). Construction of passing siding, rearrangement of tracks and construction of coal and cinder-handling facilities, Elk, W. Va., $185,900 (completed). Elimination of grade crossing, Third street, St. Albans, W. Va., $153,000 (completed).
Extension to passing sidings, Hurricane, W. Va., $101,000 (completed). Conversion of Ona tunnel into an open cut, Ona, W. Va., $713,300 (completed). Extension and improvements to hospital building, Huntington, W. Va., $237,000 (completed). Rearrangement of switches, revision of grades and installation of car retarders, westbound classification yard, Russell, Ky., $411,000 (completed). Construction of engine under pass and run-around track, $418,000, Russell, Ky., (completed). Relocation of county road and separation of grades, eastbound yard, Russell, Ky., $1,015,000 (completed). Filling Bridge 6013, Maysville, Ky., $221,000 (completed). Engine terminal improvements, Stevens, Ky., $587,000 (completed).
Rebuilding part of Bridge 11, over Mill Creek, Cincinnati, Ohio, $185,000 (completed). Elimination of grade crossing, Miami, Ohio, $112,000 (completed). Construction of intermediate passing siding, Marshall, Ohio, $104,000 (completed). Construction of center passing siding, Robbins, Ohio, $160,300 (completed). Construction of intermediate passing siding, Omega Road, Ohio, $118,500 (completed). Masonry work in connection with completion of C. & H. line, Gregg, Ohio, to Parsons, $283,000 (completed). Terminal and yard improvements, Parsons, Ohio, $254,200 (completed). Reconstruction of Bridges 2 and 3, Columbus, Ohio, $400,100 (completed).

Chesapeake Western

Important Work Undertaken: General improvement to the property, $100,000 (completed).

Chicago & Illinois Valley

First Track: Freight belt line through Ottawa, Ill., 3.2 miles, $122,700 (completed).

Chicago & North Western

First Track: Gogebic, Mich., northward, 5.62 miles.
Third Track: Jefferson Park, Ill., to Des Plaines, 7.87 miles. Deval, Ill., to Barrington, 14.75 miles.
Important Work Undertaken: Track elevation through Kenosha, Wis., cost for 1930, $900,000 (to be completed in 1932). Grade separation Stewart avenue and Fifteenth street, Chicago, C. & N. W. proportion, $150,000 (completed). Inbound and outbound freight house, Wells street yard, Chicago, $1,644,000 (80 per cent completed). Rearrangement of

State street yards, Chicago, $250,000 (to be completed December 1931). Construction of direct locomotive coaling plant and two additional sidings, Marinette, Wis., (90 per cent completed). Elimination of grade crossings, Larch, Mich., Escanaba, Cudahy, Wis., South Milwaukee and Des Plaines, Ill., $244,000 (95 per cent completed).

Additional yard tracks, Beverly, Iowa, $117,000 (completed). Construction of 7.87 miles of third track, Jefferson Park, Ill., to Des Plaines, $909,500 (completed). Construction of third track between Deval, Ill., and Barrington, 14.75 miles, $1,468,000 (completed). Construction of reinforced concrete dock warehouse and appurtenances and rearranging tracks, Milwaukee, Wis., $960,000 (completed). Construction of 2,000,000-bu. addition to Kinnickinnic grain elevator, Milwaukee, $597,000 (completed). Construction of additional ferry slip and additional yard tracks, Lake Front yard, Manitowoc, Wis., $300,000 (90 per cent completed). Construction of two-story reinforced concrete warehouse, Rapid City, S. D., $188,000 (completed).

New 800,000-gal. reservoir and water-treating plant, Proviso, Ill., $110,000 (completed). New potato-delivery yard, paved teamways and administration building, Wood Street yard, Chicago, $750,000 (completed). Additional stock-yard facilities, West Chicago, Ill., $126,000 (25 per cent completed). Reconstruction of power plant at Pintsch gas plant, California avenue, Chicago, $175,000 (90 per cent completed). Construction of extension to branch line north of Gogebic Junction, Mich., 5.62 miles $136,000 (completed). Constructing 18,346 ft. of track to serve Cargill elevator, South Omaha, Neb. (completed). Construction of Railway Express building, Chicago, $3,900,000 (70 per cent completed).

Chicago & Western Indiana

Important Work Undertaken: Mail terminal facilities, Dearborn station, Chicago, $300,000 (completed).

Chicago, Burlington & Quincy

Fourth Track: Downers Grove, Ill., to Eola, 12.02 miles, $1,070,783.

Important Work Undertaken: Rearrangement of existing facilities and extension of eastbound yard, Galesburg, Ill., $3,000,000 (40 per cent completed). Tie-treating plant improvements, Galesburg, $215,000 (completed). Grade separation, Sixteenth and Canal streets, Chicago, C. B. & Q. proportion, $1,000,000 (68 per cent completed). Revision of passenger yard, Chicago, $1,997,000 (50 per cent completed). Rearrangement of tracks west of Canal street, Chicago, $570,000 (70 per cent completed). Changes in freight house, Chicago, $162,000 (completed). Strengthening Mississippi River bridge, Burlington, Iowa, $131,000 (completed). Remodeling passenger station, Omaha, Neb., $778,000 (completed). Addition to grain elevator, Council Bluffs, Iowa, $156,500 (completed). Addition to grain elevator, Gibson, Neb., $380,000 (completed). Addition to grain elevator, St. Louis, Mo., $698,000 (completed).

Chicago, Milwaukee, St. Paul & Pacific

Important Work Undertaken: Revision of alinement reduction of grades and construction of second track, Polo, Mo., to Birmingham, 39.5 miles, $2,500,000 (75 per cent completed). Track elevation 2.65 miles, track depression 2 miles, eliminating 14 grade crossings; construction of two new freight yards, Northern division, Milwaukee, Wis., $4,000,000 (70 per cent completed). New engine terminal and yard, Sioux Falls, S. D.; $132,000 (completed). Track depression, Davenport, Ia., $235,000 (completed). Building for Cosden Oil Company, Chicago, $107,000 (completed). Laundry and commissary building Western avenue, Chicago, $148,500 completed). New yard layout and tracks, Union street yard, Chicago, $286,000 (completed). Track elevation between Church and Isabella streets, eliminating 11 grade crossings, Evanston, Ill., $2,000,000 (75 per cent completed).

Chicago, Rock Island & Pacific

First Track: Morse, Tex., to Dalhart, 59.56 miles. At Oklahoma City, Okla., 7.09 miles.

Second Track: At Oklahoma City, Okla., 4.5 miles.

Important Work Undertaken: Rearrangement of tracks account of river straightening, Chicago, $150,000 (75 per cent completed). Track elevation South Chicago, $1,200,000 (93 per cent completed). Extension of platforms and rearrangement of tracks, La Salle street station, Chicago, $105,000 (completed). Track elevation, Illinois Deep-Waterway project, Joliet, Ill., $1,413,000 (56 per cent completed). New terminal facilities, East Des Moines, Iowa, $259,000 (completed). Additional yard and mechanical facilities, Armourdale, Kan., $100,000 completed). Extension of passing sidings, El Paso-Amarillo division, $155,000 (completed). Additional yard tracks, El Paso-Amarillo division, $249,500 (completed). Grade revision, Norwood, Tex., $386,000 (completed). Exchange Avenue viaduct, Oklahoma City, Okla., $190,000 (completed). Walker Avenue subway, Oklahoma City, $261,000 (65 per cent completed). Change of line through Oklahoma City, $1,904,000 (completed). Elimination of grade crossings over system, $980,577 (90 per cent completed).

New line Coburn, Mo., to Birmingham, 73.5 miles.

Important Work Projected: New line Vega, Tex., to Forrest City, 84 miles, (under survey). New line Shamrock, Tex., to Beaver Creek, 113.5 miles (under survey).

Cincinnati Union Terminal

Important Work Undertaken: Construction of union passenger terminal, Cincinnati, Ohio, $41,000,000 (25 per cent completed).

Cleveland Union Terminals

First Track: Cleveland, Ohio, 3.53 miles (electric operation).

Second Track: Cleveland, Ohio, 3.53 miles (electric operation).

Important Work Undertaken: Construction of a union passenger terminal, Cleveland, Ohio, $80,000,000 (completed).

Colorado & Southern

Important Work Undertaken: Change of alinement and construction of steel bridge over Canadian river, Tascosa, Tex., $500,000 (30 per cent completed). Reconstruction of water, steam, air and electric lines and other facilities at Denver shops, $125,000 (completed).

Important Work Projected: New road, Childress, Tex., to Pampa, 115 miles.

Deer Park Railway

Important Work Projected: New line projected, Deer Park, Wash., 9 miles, $150,000.

Delaware, Lackawanna & Western

Important Work Undertaken: Electrification of suburban zone, Hoboken, N. J., to Dover, Roseville Avenue, Newark, N. J., to Montclair, Summit, N. J., to Gladstone and West End, N. J., to Secaucus (completed). Elimination of La Fayette-Tully grade crossing, Tully, N. Y., (completed). Elimination of two grade crossings by overhead concrete bridge, Earlville, N. Y. (completed). Elimination of Big Flats-Gibson County highway grade crossing, East Corning, N. Y., joint with Erie (completed). Elimination of crossings at Austin, Tonawanda, Hamilton, Amherst, Thompson and Parish streets, Black Rock, Buffalo, N. Y. (30 per cent completed). Reinforced concrete viaduct to eliminate Painted Post-Campbell highway grade crossing, Painted Post, N. Y. 50 per cent completed).

Denver & Rio Grande Western

Important Work Undertaken: Replacing wooden bridges and trestles with permanent structures, Colorado and Utah, $275,000 (completed). Installing 15 miles of new industry and service tracks on system, $225,000 (completed). New engine house and shop facilities with incidental trackage, Helper, Utah, $300,000 completed).

Detroit Terminal

Important Work Undertaken: Construction of four-track bridge and elevating yard tracks, Warren avenue grade separation, Detroit, Mich., $290,000 (completed).

Elgin, Joliet & Eastern

Important Work Undertaken: Addition to existing yard and construction of new yard, Gary, Ind. (completed). Addition to existing yard and construction of new yards, South Chicago, Ill. (80 per cent completed).

Erie

Important Work Undertaken: New electrically operated float bridge, Jersey City, N. J. (completed). Construction of Pier D, pile substructure, timber deck and pier house, Weehawken, N. J. (completed). Reinforced concrete arch to eliminate grade crossing, State highway, Lanesboro, Pa. completed). Construction of main-line coaling station, pumping station and extension to yard, Susquehanna, Pa. (completed). Alteration of coach-repair shop, Susquehanna (completed). Elimination of grade crossings, Austin-Amherst streets, Black Rock, Buffalo, N. Y. completed). Elimination of Holmes Street grade crossing, Youngstown, Ohio (completed).

Reconstruction of bridge H-2.15 carrying Tonnele avenue over tracks, Jersey City, N. J. 25 per cent completed). Elimination of grade crossing at Market street, Hamilton and Madison avenues, Paterson, N. J. (90 per cent completed). Construction of enginehouse, coaling and sanding facilities and improvement to McCoy Street yard, Akron, Ohio (75 per cent completed). Construction of Pier 8, timber and piles with pier house, Jersey City, N. J.) 25 per cent completed).

Galveston Wharf Company

Important Work Undertaken: Construction of a 6,000,000-bu. grain elevator, Galveston, Tex., $2,850,000 (completed).

Great Northern

First Track: Stockett, Mont., to Gaffen, 5.84 miles.

Important Work Undertaken: New road under construction, Klamath Falls, Ore., to Bieber, Cal., 87.79 miles. Gravel-washing plant, Verendrye, N. D., $135,000 (completed). Gravel-washing plant, Olds, Wash., $146,000 (completed). Gravel-washing plant, New London, Minn., $165,000 (completed). Concrete annex to Elevator S, Superior, Wis., $550,000 (completed). Frame car-repair shed, Great Falls, Mont., $138,000 (completed). Concrete snow shed, Singleshot, Mont., $225,500 (completed). Rebuilding Bridge 1, Marcus, Wash., $257,500 (completed). Paving, platforms, etc., Eighth street terminals, St. Paul, Minn., $120,500 (completed).

Revision of alinement, Yakt, Mont., $283,000 (completed). Change of line, Pinnacle, Mont., $130,000 (completed). Revision of alinement, Rankin, Mont., $173,000 (completed). New engine terminals, Interbay, Wash., $423,000 (completed). Construction of power plant, Whitefish, Mont., $130,000 (15 per cent completed). New power plant, Great Falls, Mont., $201,500 (15 per cent completed). New power plant, Williston, N. D., $145,000 (15 per cent completed). Steel coal chute, cinder conveyor and tracks, Brockton, Mont., and Wagner, $176,000 (20 per cent completed). Frame enginehouse, steel coal chute, cinder conveyor and tracks, Glasgow, Mont., $130,000 (15 per cent completed).

Gulf, Mobile & Northern

Important Work Undertaken: Grade revision and strengthening of roadbed, Ackerman, Miss., to Richton, $126,000 (completed). Construction of pier and dredging, Mobile, Ala., $193,000 (60 per cent completed).

High Point, Thomasville & Denton

Important Work Undertaken: General Office, heating plant and siding High Point, N. C., $100,000 (90 per cent completed).

Houston Public Belt Railway

Important Work Undertaken: Construction of extension, North side of ship canal, Turning Basin to Green's Bayou, Houston, Tex., 8 miles, $245,000 (25 per cent completed).

Illinois Central

Second Track: At Vicksburg, Miss., 1.17 miles.

Important Work Undertaken: Extend 16-in. city water main to Markham yard, Chicago, $111,000 (completed). Additional mail-handling facilities, Central station, Chicago, $108,000 (completed). Randolph street viaduct and suburban station, Randolph street, Chicago, $1,500,000 (20 per cent completed). Electrification of freight service, extension from Randolph street to 39th street, Chicago, $4,500,000 (23 per cent completed). Replacing existing drawbridge over Green river with a 150-ft. bascule span, Rockport, Ky., $340,000 (22 per cent completed). Extension of yard, East St. Louis, Ill., $299,600 (50 per cent completed).

(St. Charles Air Line). New structure and moving present 260-ft. bascule bridge to new location over new channel, Chicago river. Chicago, $500,000 (completed).

Illinois Terminal

Important Work Undertaken: Construction of new passenger terminal, St. Louis, Mo., expended to date $3,400,000 (subway and elevated lines to be completed March, 1931; station to be completed 1932).

Indianapolis Union Railway

Important Work Undertaken: Relocation of locomotive-repair shop elimination of 22 street crossings and 4 railway crossings at grade, construction of 5-track bridge over White river and construction of new classification yard, Indianapolis, Ind., $13,000,000 (18 per cent completed).

Kansas City Terminal

Important Work Undertaken: Steel viaduct over tracks, Oak street, Kansas City, Mo., $300,000 (25 per cent completed).

Kentucky & Indiana Terminal

Important Work Undertaken: Track elevation, two miles, separating grades at five streets, Louisville, Ky., $700,000 (80 per cent completed).

Lehigh Valley

Important Work Undertaken: Structural changes in Pier 38, Houston street, North river, New York (completed) Double-track lift bridge across Newark bay, between Bayonne and Oak Island, Newark, N. J. (completed). Raising and enlarging Oak Island yard, construction of new engine terminal, installation of car retarders, new freight transfer and new office building, Oak Island, Newark (completed). Construction of eight concrete coal silos, 300 tons capacity each, to replace coal trestle, Poinier street, Newark (completed). Elimination of North Broad Street grade crossing, Hillside, N. J. (completed). Elimination of grade crossing, Chemung street, Waverly, N. Y. (completed). Elimination of grade crossing, Sheridan drive, Williamsville, N. Y. (completed). Elimination of grade crossing, Getzville road, Williamsville (completed).

Long Island

Important Work Undertaken: Elimination of four grade crossings Ozone Park, L. I., New York, $2,278,000 (90 per cent completed). Elimination of five grade crossings and construction of jump over bridge, Jamaica East L. I. $6,934,400 (95 per cent completed). Elimination of four grade crossings, Corona, L. I., $1,455,500 (completed). Elimination of South Country grade crossing, Sayville, L. I., $170,000 (completed). Elimination of Main street, Douglaston, City of New York, $223,000 (completed). Additional substations and equipment, $734,700 (50 per cent completed).

Los Angeles Junction Railway

First Track: Connection with Atchison, Topeka & Sante Fe, Bandini, Cal., 0.31 mile.

Louisville & Nashville

First Track: Heyburn, Ky., to Crockett, 7.77 miles. Glidden, Ky., to Hagans, Va., 12.87 miles.

Important Work Undertaken: Eleven-story extension to general office building, Louisville, Ky., $800,000 (completed). Elimination of grade crossing, Third avenue, Louisville, $350,000 (completed). Track elevation and rearrangement of tracks, Birmingham, Ala., $4,000,000 (30 per cent completed). Elimination of three grade crossings, Covington, Ky., $365,000 (35 per cent completed). Reconstruction of Doe River viaduct, between Louisville, Ky., and Henderson, $293,000 (25 per cent completed). New bridge across Big Hatchie river, $106,000 (25 per cent completed).

Maine Central

Important Work Undertaken: (Portland Terminal Company) New pile and timber wharf, 1,000 ft. long, and transit shed, Portland, Me., $550,000 (completed). New pile and timber wharf, 600 ft. long, and two coal discharging towers, South Portland, Me., $500,000 (completed). New pile and timber wharf, 1,500 ft. long, for miscellaneous cargoes, Portland, Me., $700,000 (50 per cent completed).

Missouri-Kansas-Texas

Important Work Undertaken: Substructure for New Missouri river bridge, Boonville, Mo., $280,000 (completed).

Missouri Pacific

First Track: Latour Jct., Ark., to M. H. & L. connection, 0.04 mile. Gurdon, Ark., to new connection 0.14 mile. Ft. Smith, Ark., 0.37 mile. Chester, Ill., 0.26 mile.

(Sugar Land Railway). Cabell, Tex., to Hiejey, 12 miles.

Second Track: Pacific, Mo., to Boles, 11.45 miles. Lamine, Mo. 3.01 miles. Myrick, Mo., 3.8 miles. White River, Ark., to Grand Glaise, 9.82 miles. Coombs, Colo., to Pueblo, 2.08 miles.

Third Track: Little Rock, Ark., 0.09 miles.

Important Work Undertaken: Additional storage capacity, 2,076,000 bu., to grain elevator, St. Louis, Mo., $700,000 (completed). Connection to south approach to Municipal bridge including four crossings and interlocking, St. Louis, Mo., $152,000 (11 per cent completed). Construction of line from Illmo, Mo., to Cape Girardeau, $505,000 (completed). Purchase and reconstruction of Cape Girardeau Northern, Cape Girardeau, $238,000 (completed). Construction of 3.42 miles of second track, Rockwood, Ill., to Cora City, $142,000 (15 per cent completed). Revision of grade and alinement and construction of 12 miles of second track, Lake Hill, Mo., to Eureka, $4,573,000 (83 per cent completed). New bridge on improved alinement, Wellington, Mo., $193,000 (completed).

Three miles of second track with automatic signals, Myrick, Mo., $356,000 (completed). Construction of three miles of second track, including automatic signals, Lamine, Mo., $175,000 (completed). Replacing frame trestle with concrete culvert and filling; replacing frame trestle with deck plate-girder span on concrete abutments and filling, Barber, Mo., and Marvel Cave, $232,000 (50 per cent completed). Construction of grain elevator, 280,000 bu. capacity, Kansas City, Mo., $286,000 (completed). Revision of grade and alinement, Gypsum City, Kan., to Hunsington, $1,056,000 (completed). Revision of grade and alinement, Council Grove, Kan., to Otawatomie, $2,729,000 (completed). Constructing double track on connection with Atchison, Topeka & Santa Fe replacing bridge over Arkansas river, Pueblo, Colo. $119,000 (completed).

Preliminary work on new freight-house facilities, Little Rock, Ark., $480,000 (95 per cent completed). Extension of second track, Bald Knob, Ark., $123,000 (completed). Reconstruction of Bridge 0.37, Arkadelphia, Ark., $165,700 (69 per cent completed). Raising grade above high water, Newport, Ark., $1,796,000 (completed). Renewal of Bridge 312-H Newport, Ark., (completed). Renewal of Bridge 85, Medina, Ark., $148,000 (90 per cent completed). Renewal and filling portion of north trestle approach, Bridge 83, Benzal, Ark., $292,000 (completed). Raising grade above high water across White and Cache river bottoms, Bald Knob, Ark., to Wynne, $300,000 (completed). Reduction of grades, Chester, Ill., to Pinckneyville, Ill., $268,000 (completed). Replacing, reconstructing and strengthening bridges to carry heavier locomotives, Jefferson City, Mo., to Bagnell, $148,000 (completed). Installing bank protection, Nearman, Kan., $117,000 (completed). Reconstructing various bridges, Douglas, Neb., $131,000 (completed). Reconstruction of Bridge 251, Louisville, Neb., $124,000 (80 per cent completed).

Monessen Southwestern

Important Work Undertaken: New road under construction, Monessen, Pa., to Belle Vernon $1,200,000 (started).

Montana Power Company

Important Work Undertaken: New road under construction, from Pablo, Mont., to a point on the Flathead river, 8 miles.

Mound City & Eastern

Important Work Undertaken: Construction of new line, Mound City, S. D., to Leola, 70 miles.

Nashville, Chattanooga & St. Louis

Important Work Undertaken: Construction of passenger terminal and incidental facilities, Atlanta, Ga., $577,000 (completed).

New Orleans, Natalbany & Natchez

First Track: Grangerville, La., to Slaughter, 18.89 miles.

New York Central Lines

First Track: New passenger tracks, Cleveland Union terminal, 0.559 mile (steam operation). New passenger tracks, Cleveland Union terminal, 5.158 miles (electric operation).

Second Track: New passenger track, Cleveland Union Terminal, Cleveland, Ohio, 5.236 miles (electric operation).

(Cleveland, Cincinnati, Chicago & St. Louis). East of Anderson, Ind., 1.69 miles. Terre Haute, Ind., to Sandford, 7.55 miles. Whitestown, Ind., to Colfax, 22.77 miles.

Third Track: Chelsea, N. Y. to Poughkeepsie, 7.7 miles.

Fourth Track: Chelsea, N. Y. to Poughkeepsie, 7.7 miles.

Important Work Undertaken: New road under construction, East View, N. Y. to Briarcliff Manor, 4.6 miles.

(New York City, Grand Central terminal). Extension of loop track from Forty-fifth street to Forty-ninth street, $1,560,000 (completed). New substations, pump, heater and compressor rooms at Forty-third street, $4,350,000 (completed). Alterations and additions to restaurant, suburban level, $103,500 (completed). Improving the ventilating system, express and suburban levels, $230,000 (7 per cent completed). Substructure, Hotel Waldorf-Astoria, Fiftieth street, $836,000 (completed). Miscellaneous terminal facilities on account of Hotel Waldorf-Astoria substructure work, $150,000 (83 per cent completed). Additions and alterations for post office department, 466 Lexington avenue, $100,000 (completed). Additional electric power, Hotel Waldorf-Astoria, $177,000 (20 per cent completed).

Milk and automobile-handling facilities, West Sixtieth Street yard, New York, $1,550,000 (80 per cent completed). Duct lines West 59th street to West 158th street, New York, $160,000 (17 per cent completed). Foundations for two warehouses, West End avenue between Sixty-second and Sixty-fourth streets, New York, $200,000 (completed). Rearrangement of Thirtieth Street yard, first stage, New York, $379,500 (40 per cent completed). Foundations for express highway No. 2 between Fifty-ninth and Seventy-second streets, New York, $200,000 (15 per cent completed). Relocating and rebuilding tracks from West 77th street to West 166th street and from West 158th street to Ft. Washington Park cut, New York, $1,200,000 (completed). Elimination of grade crossing, West 158th street, New York, $575,000 (90 per cent completed). New duct line to replace overhead transmission line, Botanical Garden, N. Y., to Williamsbridge, $249,000 (65 per cent completed). High tension emergency interconnection with Interboro Rapid Transit, Port Morris to 138th street, New York, $103,500 (completed). West Side improvements, New York, demolition of buildings, $600,000 (60 per cent completed). West Side improvement, purchase of property, $48,700,000 (70 per cent completed).

Additional circuit-breaker houses, Claremont Park, New York to White Plains, $115,900 (completed). Electrification of tracks, 3 substations and 7 circuit-breaker houses, Spuyten Duyvil to Sixtieth street, New York, $3,076,000 (20 per cent completed). West Side electrification, Spuyten Duyvil to Croton, New York, new substation and four circuit-breaker houses, $299,000 (60 per cent completed). Duct lines and splicing chambers, north and south shores of Harlem river, Spuyten Duyvil, New York, $253,000 (completed). Track changes and reverse signaling, Grand Central terminal to Mott Haven, New York, $3,872,000 (55 per cent completed). Yard improvements and Melrose Central building, Mott Haven, New York, $3,685,000 (completed).

New passenger station, Tremont, N. Y., $105,000 (completed). Automobile-handling facilities, Kingsbridge yard, Marble Hill, N. Y., $1,470,000 (completed). Extension to station platforms and canopies, New York to White Plains and Harmon, $850,000 (completed). Expansion of shop facilities, Harmon, N. Y., $2,684,000 (90 per cent completed).

Additional platforms, driveways and tracks for handling milk, Weehawken, N. J., $463,000 (completed). Additions and alterations to Pier K, Weehawken, $1,100,000 (95 per cent completed). Grade separation Nyack turnpike, West Nyack, N. Y., $223,000 (completed). Elimination of grade crossing, Mansion street, Coxsackie, N. Y., $234,000 (completed). Viaduct at 238th street, Wakefield, N. Y., $252,000 (95 per cent completed). Viaduct at 241st street, Wakefield, $920,000 (completed). Elimination of Main street grade crossing, Chappaqua, N. Y., $356,000 (completed). Grade separation, O'Dell avenue, Gray Oaks, N. Y., $251,000 (completed).

Main Street grade separation, New Hamburg, N. Y., $147,000 (completed). Construction of overhead bridge and pedestrian subway to eliminate grade crossing, Cold Spring, N. Y., $188,000 (completed). Construction of third and fourth track, Hudson division, Chelsea, N. Y., to Poughkeepsie $6,325,000 (completed). Grade separation, Hardins cross-

ing, Schenectady, N. Y., $199,700 (completed). Elimination of grade crossing, Ft. Hunter road, Tribes Hill, N. Y., $131,500 (completed). Additional track pans for tracks 3 and 4, Rome, N. Y., $420,000 (80 per cent completed). Additional track at creosoting plant, Rome, N. Y., $112,500 (90 per cent completed). Grade separation, West Rome, N. Y., $166,000 (completed). Elimination of grade crossing, Salisbury road, Poland, N. Y., $120,700 (completed). Grade separation, Wadsworth crossing, Great Bend, N. Y., $137,000 (completed). Grade separation, Kenmore crossing, Evans Mills, N. Y., $199,000 (completed). Reconstruction of Bridge U-16, Marcy, N. Y., $118,300 (completed). Elimination of grade crossing, Plank Road highway, Central Square, N. Y., $156,100 (18 per cent completed). Grade separation, Colosse crossing, Maple View, N. Y. $141,800 (20 per cent completed).

Elimination of grade crossing, Pary road, Memphis, N. Y., $100,000 (completed). Grade separation, Penfield and Landing roads, Brighton, N. Y., $345,000 (completed). Construction of independent power line and new passenger stations, Albany, N. Y., to Syracuse, $1,250,000 (completed). Elimination of grade crossing, Thompson road, Syracuse, N. Y., $665,600 (90 per cent completed). Elimination of grade crossing, Midler avenue, Syracuse, $207,300 (20 per cent completed). Purchase of land for terminal improvements, Syracuse, $5,000,000 (50 per cent completed). Grade separation, Cawles crossing, Hannibal, N. Y., $117,700 (completed). Elimination of grade crossing, Albion street, Holley, N. Y., $163,700 (10 per cent completed). Reconstruction of Bridge F-156, Knowlesville, N. Y., $139,400 (26 per cent completed). Elimination of grade crossing, Clark street, Auburn, N. Y., $143,500 (completed). Elimination of grade crossing, Cartersville road, Pittsford, N. Y., $125,400 (completed). Grade separation, Clark street, Relius, N. Y., $160,800 (completed).

Reconstruction of Bridge T-5, Depew, N. Y., $146,500 (completed). Car retarders and additional tracks, Gardenville yard, Depew, N. Y., $900,000 (completed). Elimination of grade crossing, Harlem avenue, Forks, N. Y., $267,000 (completed). Reconstruction of Bridge T-15, Blasdell, N. Y., $127,800 (completed). Austin-Amherst grade crossing elimination, Black Rock, Buffalo, N. Y., N. Y. C. proportion $1,559,200 (60 per cent completed). Railway terminal post office, Buffalo, N. Y., $242,000 (completed). Survey and acquisition of lands Keating, Pa., to Browns, $850,000 (88 per cent completed).

Four-track subway eliminating grade crossing, Gowanda road, Athol Springs, N. Y., $276,000 (30 per cent completed). Grade separation, Asbury Chapel road, Swanville, Pa., $176,000 (3 per cent completed). Additional l. c. l. freight facilities, Cleveland, Ohio, $300,000 (completed). Additional main tracks and yard tracks, electrification and new station at East Cleveland (exclusive of Cleveland Union terminal) $700,000 (completed). Elimination of grade crossing, Telegraph road, Elyria, Ohio, (one per cent completed). Reconstruction of Maumee River dock and dredging $254,000 (completed). Grade separation, Monroe street, Toledo, Ohio, $480,000 (10 per cent completed). Elimination of grade crossing, West Central avenue, Richards, Ohio, $275,000 (45 per cent completed). Grade separation, State highway No. 20, Delta, Ohio, $274,000 (completed).

Elimination of grade crossings at Green and Central avenues, Detroit, Mich., $162,000 (completed). Replacing temporary bridges with permanent structures, Springwell and Lawndale avenues, grade separation, Detroit, Mich., $125,000 (10 per cent completed). Grade separation, Southfield road, Ecorse, Mich., $232,000 (completed). Extension of track elevation to eliminate grade crossings at Division, Cherry and Walnut streets, South Bend, Ind., $859,000 (2 per cent completed). River-straightening improvements, Chicago river, Chicago, $1,445,000 (completed). Replace Gantry crane with new cantilever crane, Chicago (25 per cent completed). Extension of station platforms with canopies La Salle Street station; construction of suburban coach yard and install temporary tracks to N. Y. C. & St. L. freight house, $156,100 (completed). Grade crossing elimination, State route No. 2, North Hayden, Ind. (2 per cent completed). Replacing 80-ft turntable with a 100-ft. turntable, Gibson, Ind., (completed). Water-treating plants, Huron, Ohio, Air Line Junction, Stryker, Mina, Elkhart, Ind., (2) Chesterton $487,800 (75 per cent completed).

(Cleveland, Cincinnati, Chicago & St. Louis). Revision of passenger and freight main tracks; additional yards; new engine terminal; grade separations; and electrification of westerly approach to Cleveland Union Terminal, $6,750,000 (95 per cent completed). Renewal and extension of multiple concrete arches, Bridges 168, 182, 210 and 227, between Guilford, Ind., and Bonnell, $656,000 (90 per cent completed). Reconstruction of paint shop, Beech Grove, Ind., $250,000 (completed). Extension of passing sidings and installation of automatic signals, Indianapolis, Ind., to Whitestown, and Colfax, Ind., to Clarks Hill, $200,000 (completed). Consolidation of single track main lines of C. C. C. & St. L. and N. Y. C. & St. L. to give double track; construction of passing siding, interlocking, coaling station and water station, La Fayette, Ind., to Altamont, $319,000 (completed). New freight house and team yard, Marshall avenue, Cincinnati, Ohio, $440,000 (completed).

(Indiana Harbor Belt). Elimination of grade crossings with other railways and with highways, Bellwood, Ill., I. H. B. proportion, $696,800 (2 per cent completed). Elimination of grade crossing, Burnham avenue, Calumet City, Ill., I. H. B. proportion, $198,000 (62 per cent completed).

(Michigan Central). Grade crossing elimination, Burnham avenue, Calumet City, Ill., M. C. proportion, $126,200 (completed). Grade separation, Dougall road, Windsor, Ont., $105,000 (50 per cent completed). Improved facilities for American Express Agency, Detroit Terminal station, Detroit, Mich., $123,400 (completed). Separation of grades, Miller road, Dearborn, Mich., $267,500 (30 per cent completed). Installing permanent bridges, grade separation, Springwells and Lawndale avenues, Detroit, Mich., $120,800 (40 per cent completed).

(Pittsburgh & Lake Erie). Branch line down Ohio river from Monaca, to Josephtown, 3 miles, $450,000 (75 per cent completed). Facilities for transferring freight between rail and river, Colona, Pa., $359,000 (5 per cent completed). Constructing new freight yard and incidental facilities, Pittsburgh, Pa., $150,000 (completed).

(Ohio Central). Additional unit, Stanley yard, including highway viaduct and incidental yard facilities, Toledo, Ohio, $1,700,000 (completed). Additional unit Northbound yard, including car retarders, Stanley yard, Toledo, $1,432,000 (45 per cent completed).

New York, Chicago & St. Louis

Second Track: Montmorenci, Ind., to Templeton, 9.69 miles. At Altamont, Ind., 0.11 miles.

Important Work Undertaken: Grade separation and east approach to new union depot, Cleveland and East Cleveland, Ohio, $19,000,000 (90 per cent completed). New freight yards, East 55th and East 37th streets, Cleveland, $3,500,000 (completed). Re-alinement of main track and renewal of bridge, Angola, N. Y., $152,000 (40 per cent completed). Renew and fill approaches to four bridges, Coffeen, Ill., $543,000 (65 per cent completed).

New York, New Haven & Hartford

Third Track: Westerly, R. I. to Bradford, and Kingston, R. I. to Davisville, 13.73 miles.

Important Work Undertaken: Elimination of grade crossing, 238th street viaduct, Woodlawn, N. Y., joint with N. Y. C., N. Y., N. H. & H. proportion, $165,100 (90 per cent completed). Elimination of grade crossing, 241st Street viaduct, Woodlawn, N. Y., joint with N. Y. C., N. Y., N. H. & H. proportion, $135,200 (completed). Construction of one-story brick warehouse, tracks and driveway, Harlem river, New York, $175,000 (80 per cent completed). Installation of Cyclone-type cinder eliminator, power plant at Cos Cob, Conn., $119,500 (completed). Construction of oil-burning central heating plant and incidental equipment, New Haven, Conn., $510,000 (completed).

Construction of 4-track concrete bridge over West river, New Haven, Conn., $175,000 (completed). Extension of transfer agent's office and installation of pneumatic-tube dispatch service, Cedar Hill yard, New Haven, Conn., $100,000 (completed). Relocation of main tracks to better alinement, Sachems Head, Conn., $157,000 (completed).

Reconstruction of 13.73 miles of passing siding to convert into third main track, Westerly, R. I., to Bradford, and Kingston, R. I., to Davisville, $872,000 (completed). Grade separation, French's crossing, Plainfield, Conn., $110,000 (completed). Construction of concrete viaduct over tracks and Housatonic river, to eliminate two grade crossings, Cornwall Bridge, Conn., $416,000 (completed). Elimination of Main Street grade crossing, Jewett City, Conn., $342,000 (completed).

(Boston Terminal Company). Reconstruction of train shed and alterations in South Station, Boston, Mass., $1,800,000 (95 per cent completed).

Norfolk & Western

Important Work Undertaken: Elimination of grade crossings, Columbus, Ohio, $4,500,000 (99 per cent completed). Extend Pier S, Lamberts Point, Va., $550,000 (90 per cent completed). Extension of two warehouses, Lamberts Point, $255,000 (90 per cent completed). Construction of general office building, Roanoke, Va., $700,000 (50 per cent completed). Construction of passenger station, second track and incidental facilities, Portsmouth, Ohio, $1,090,000 (60 per cent completed). Construction of smith shop, Roanoke, Va., $225,000 (99 per cent completed). Reconstruction of three bridges, Shenandoah division $483,500 (25 per cent completed). Construction of new line to extend Jacobs Fork branch from Newhall, W. Va., to the W. Va.-Va. line, 6 miles, thence up Horsepen creek 2 miles, $1,240,000 (80 per cent completed).

Construction of Warehouse 4, Lamberts Point, Va., $100,000 (completed). Construction of passing siding, Wharncliffe, W. Va., $137,000 (completed). Bridge improvements at various points on system, $664,000 (completed). Grade separation, Portsmouth, Ohio, $257,000 (completed).

(Big Sandy & Cumberland). Reconstruction of 25 miles of narrow-gage line, converting it to standard gage, Devon, W. Va., to Hurly and from Grundy, W. Va., down the Levisa river; also construction of 14 miles of standard gage cut-off from Hurley to Levisa river, $8,000,000 (92 per cent completed).

(Guyandot & Tug River). Construction of 10.5 miles of new road, Wharncliffe, W. Va., to Gilbert, $3,500,000 (60 per cent completed).

Northern Pacific

Important Work Undertaken: Third Street viaduct, St. Paul-Minneapolis, Northern Pacific proportion, $113,700 (completed). Channel changes and bridge replacements, Yellowstown division in Montana, $569,000 (completed). Industrial development, filling tide lands, Seattle, Wash., $190,000 (60 per cent completed).

Oklahoma City-Ada-Atoka

Important Work Projected: Construction of new line southwest from Marion, Okla., 7 miles.

Pennsylvania

First Track: Broad Street suburban station Philadelphia, Pa., to West Philadelphia, 1.27 miles. Middle division connection, Schuylkill river to HM tower, 0.48 miles.

Second Track: At Philadelphia, Pa., 1.75 miles.

Third Track: At Philadelphia, Pa., 1.84 miles. Between Sixteenth and Eighteenth streets, Chicago, 0.28 miles. Bradford, Ohio, to West Bradford, 2.29 miles.

Fourth Track: At Philadelphia, 1.87 miles. Between Sixteenth and Eighteenth streets, Chicago, 0.30 miles.

Important Work Undertaken: New road under construction, Block Station D-3 to Mantua block station, 2.5 miles. Revision and additions to Meadows yard, Kearny, N. J., $510,000 (completed). Changes in Debrosses Street ferry station to permit its use as a freight station, New York, $135,000 (completed). Electrification of main line, New York to Philadelphia, Pa., $26,000,000 (35 per cent completed). Extension to Enterprise branch and connection to industrial plant, Trenton, N. J., $160,000 (completed). Elimination of grade crossing, Bloomsdale road, Bristol, Pa., $200,000 (5 per cent completed). Construction of two bridges (one freight, one passenger) over Hackensack river and change alinement, Marion, N. J., $8,000,000 (completed). Warehouse and pier terminal, Jersey City, N. J., $6,750,000 (completed). Extension of lunch room and service kitchen, Pennsylvania station, New York, $115,000 (completed). Additional pier, Pier F, reconditioning Pier H, Warehouse and Pier Terminal, Jersey City, N. J., $2,850,000 (completed). Extension of passenger facilities and construction of lift bridge over Passaic river, Newark, N. J., $15,000,000 (5 per cent completed).

Reconstruction of overhead highway bridge, Lincoln highway, Coatesville, Pa., $185,000 (completed). Reconstruction of overhead highway bridge, Lincoln highway, Coatesville, Pa., $170,000 (85 per cent completed). Reconstruction of overhead bridge, Paxton street, and rearrangement of track, freight station, Harrisburg, Pa., $820,000 (completed). Six-story extension to inbound freight house, Harrisburg, $125,000 (completed). Reconstruction of overhead bridge, Lincoln highway, Mountville, Pa., $155,000 (completed). New overhead bridge for grade separation, Dewart, Pa., $225,000 (10 per cent completed).

Merchandise classification yard, float bridge, and coaling facilities for tug boats, South Philadelphia, Pa., $2,640,000 (50 per cent completed). Ten additional stalls in enginehouse, South Philadelphia, $260,000 (completed). Construction of coal yard, Twenty-sixth street and Washington avenue, Philadelphia, Pa., $410,000 (completed). Grade separation, Mocanaqua, Pa., $115,000 (completed). Grade separation, B street, Philadelphia, $395,000 (20 per cent completed). Grade separation south of Sunbury, Pa., $300,000 (95 per cent completed). Construction of viaduct at Melvale avenue, Baltimore, Md., $230,000 (completed).

Elimination of grade crossing, Cockeysville, Md., $365,000 (95 per cent completed). Elimination of grade crossing north of Phelps Junction,

N. Y., $105,000 (completed). Elimination of grade crossing south of Pheips Junction, N. Y., $115,000 (completed). Separation of grades, Kenwood avenue, Baltimore, Md., $190,000 (completed). Grade separation, Newport, Del., $245,000 (completed). Elimination of grade crossing, Middle River, Md., $150,000 (50 per cent completed). Grade crossing elimination, Swarthmore, Pa., $370,000 (30 per cent completed). New cattle-pen building, Philadelphia, $1,530,000 (60 per cent completed).

Elimination of grade crossing, Salisbury, Md., $215,000 (completed). Elimination of grade crossing, Repaupo, N. J., $130,000 (completed). Grade separation, South Seaville, N. J., $100,000 (completed). New enginehouse and incidental facilities, Forty-sixth street, Philadelphia, Pa., $1,035,000 (completed). Reconstruction of New York-Pittsburgh subway to provide increased clearance, Philadelphia, Pa., $424,300 (completed). Continuation of work on Philadelphia passenger terminals, Philadelphia, Pa., $60,000,000 (65 per cent completed). Additional yard facilities, Wierton Junction, W. Va., $392,900 (completed).

Elimination of grade crossings at Bowen and Woodard roads, Elma, N. Y., $150,000 (completed). New bridge over Allegheny river, South Oil City, Pa., $1,388,000 (completed). Addition of a traveling marine leg on grain dock, Erie, Pa., $250,000 (completed). New freight and produce terminal and holding yard, Pittsburgh, Pa., $3,273,000 (completed). Wrecking buildings for new passenger terminal, Pittsburgh, Pa., $104,700 (85 per cent completed).

Extension of branch line, Economy, Pa., $405,000 (completed). Extension of produce terminal, Pittsburgh, Pa., $225,000 (completed). Construction of Allegheny River boulevard, shifting tracks and bridge work, Brilliant, Pa., $223,100 (75 per cent completed). New viaduct to carry boulevard over Pitcairn yard, Pitcairn, Pa., $127,000 (completed). New 110 ft. turntable and extension of ash pits, South Oil City, Pa., $156,200 (35 per cent completed). Addition to grain elevator, Erie, Pa., $325,000 (25 per cent completed). Elimination of grade crossing, Canawaugus, N. Y., $110,000 (completed). Construction of overhead bridge and diversion of highway to eliminate four grade crossings, Enon, Pa., $132,500 (completed). Grade separation, Haws crossing, Johnstown, Pa., $160,000 (completed). Grade separation, Lamb's crossing, South Fork, Pa., $109,900 (completed).

Overhead bridge and pedestrian subway to eliminate grade crossing, Indiana street, Seward, Pa., $151,000 (completed). Elimination of grade crossing, Benton road, Salem, Ohio, $196,400 (completed). Track elevation and new freight house, Newark, Ohio, $1,480,000 (completed). Elimination of Barclay grade crossing, Industry, Pa., $276,700 (completed). Extension of branch line, Canton, Ohio, $198,100 (completed). Elimination of Main Street grade crossing, Wierton, W. Va., $359,200 (25 per cent completed). Elimination of grade crossing, Athol Springs, N. Y., $366,000 (24 per cent completed). Reconstruction of Bridge 22.70 Angola, N. Y., $195,000 (75 per cent completed). Road diversion to eliminate grade crossing, Coal Ridge, Ohio $105,000 (50 per cent completed).

Construction of eight receiving tracks and extension of 3-span concrete slab bridge, Bay Junction yard, Sandusky, Ohio, $219,000 (completed). Acquiring property and strengthening dock wall, river straightening, Chicago, $1,318,900 (completed). Separation of grades with other railways, Fifteenth street and Stewart avenue, Chicago, Pennsylvania proportion, $1,396,400 (70 per cent completed). Elimination of grade crossing, Anthony boulevard, Ft. Wayne, Ind., $198,700 (completed). New passenger station, Gary, Ind., $110,400 (completed). Extension of Grogan yard and elimination of five grade crossings, Columbus, Ohio, $1,800,000 (completed).

Separation of grades at Fort street, Dix avenue and Miller road, Detroit, Mich., $295,700 (completed). Extension of 10 receiving tracks, Grogan yard, Columbus, Ohio, $450,000 (completed). Freight house, train tracks and incidental facilities, Dayton, Ohio, $549,000 (completed). Track elevation, Thirty-ninth to Sixty-ninth streets, Chicago, $1,168,000 (completed). Track elevation Sixty-ninth to Eighty-seventh streets, Chicago, $386,800 (25 per cent completed). Siding to Oakley Factory Colony, East Norwood, Ohio, $318,300 (completed). Construction jointly with B. & O. of eastward running track, East Columbus, Ohio, $278,000 (completed). Construction of new main track wye, Ridgeville, Ind., $127,700 (completed). Track elevation, Dutoit to Bainbridge streets, Dayton, Ohio, $554,000 (80 per cent completed). Separation of grades at Beechmont avenue and elimination of crossings at Linwood and Hutton streets, Cincinnati, Ohio, $606,000 (completed).

Peoria & Pekin Union

Important Work Undertaken: Construction of 125-ft. through girder span and moving 118-ft. truss span over Farm Creek, East Peoria, Ill. (completed). General renewal and extension to enginehouse, Peoria, Ill. (completed).

Pere Marquette

Second Track: Vine, Mich., to St. Joseph, 3.9 miles.
Important Work Undertaken: Improvements in coaling and water facilities, New Buffalo, Mich., $100,000 (completed). Improvements in engine terminal facilities, Grand Rapids, Mich., $125,000 (completed). New ferry slip and berthing dock, Ludington, Mich., $400,000 (completed). Auxiliary yard, new produce terminal, Detroit, Mich., $300,000 (completed). Grade crossing elimination, Fort street, Detroit, Mich., $480,000 (completed). Elimination of grade crossing at Dix avenue, Detroit, $430,600 (completed). Reconstruction of bridge over Michigan Central tracks, Detroit, $600,000 (completed). Elimination of grade crossing, South Lyon, Mich., $100,000 (completed). Reconstruction of bridge over Black river, Port Huron, Mich., $325,000 (80 per cent completed).

Pittsburgh & West Virginia

Important Work Undertaken: New road under construction, Connellsville, Pa., to Pierce, Pa., 39.9 miles. At Donora, Pa., connection to Donora Southern, 5.9 miles.

Pittsburgh, Chartiers & Youghiogheny

Important Work Undertaken: Line under construction, Van Emman, Pa., to Eighty-Four, 8.36 miles (worked deferred temporarily).

Quanah, Acme & Pacific

First Track: Quanah, Tex., to Acme, 6.5 miles.

Reading

First Track: Line extensions at various points in Pennsylvania, 2.72 miles.
Second Track: At various points in Pennsylvania, 0.76 miles.
Important Work Undertaken: Elimination of grade crossings, Wissahickon creek to Fountain street, Manayunk, Pa., $4,500,000 (completed). Abolition of six grade crossings, Emaus, Pa., to Macungie, $160,000 (completed). Elimination of grade crossing, Sixty-first street, Chester branch, Philadelphia, Pa., $225,000 (completed). Rebuilding Bridge 185-96 over west branch, Susquehanna river, Muncy, Pa., $800,000 (completed).

Replacing bridges at Charlotte and Washington streets, Pottstown, Pa., $117,000 (started). Elimination of grade crossing, Crescent boulevard, West Collingswood, N. J., $125,000 (completed). Reconstruction of Bridge 62-29 over Pottsville pike, Tuckerton, Pa., $260,000 (completed). New passenger station, Trenton Junction, N. J., $150,000 (completed). New stone passenger station, Franklin street, Reading, Pa., $116,000 (completed). Elimination of grade crossing, Barley Mill road, Greenville, Pa., $122,000 (completed). Construction of 3-story storehouse, platforms and driveways, Reading, Pa., $750,000 (completed). Construction of 12-story terminal commerce building, Philadelphia, Pa., $4,680,000 (completed). Elimination of two grade crossings, St. Clair, Pa., $120,000 (completed). Construction of overhead bridge to carry new street, Olney avenue, Olney, Pa., $116,000 (completed).

Replacing Bridge No. 1, Olney, Pa., $152,700, (20 per cent completed). Elimination of grade crossings at Valley Green road and Mill road, Camp Hill, Pa., $125,000 (completed). Elimination of three grade crossings, Penellyn, Pa., $116,700 (completed). Grade separation at Marshville road and Lake road, Tuckahoe, N. J., $117,000 (completed). Replacing stone arch with steel span, Quakake, Pa., $130,000 (started). New passenger and freight stations, Royersford, Pa., $127,500 (10 per cent completed). Constructing new freight house and additional tracks, Newmarket and Spring Garden streets, Philadelphia, Pa., $224,000 (completed). Replacing timber tunnel lining with brick and concrete lining, Dillinger, Pa., $108,000 (completed). Construction of fireproof pattern storage shop, locomotive shops, Reading, Pa., $100,000 (completed). Reconstruction of Bridge 146-47 over the Susquehanna river, Rupert, Pa., $700,000 (started). Extension of freight house No. 3 and yard tracks, Front and Noble streets, Philadelphia, Pa., $605,000 (completed). Extension of wharf and construction of double-deck superstructure, Pier B, Philadelphia, Pa., $700,000 (75 per cent completed). Reconstruction of Bridge 200-78, over Maynard street, Williamsport, Pa., $150,000 (started).

Electrification of Philadelphia suburban lines $21,500,000, which includes the following items of work in progress: Abolition of grade crossings on Chestnut Hill branch, $5,700,000 (20 per cent completed). New electric car shops, including tracks and equipment, Wayne Junction, Pa., $600,000 (70 per cent completed). Electrification structures, wiring and substations: Reading terminal to Wayne Junction, $743,000 (75 per cent completed); Wayne Junction to Lansdale, $1,476,000 (70 per cent completed); Glenside to Hatboro $170,000 (50 per cent completed); Lansdale to Doylestown, $193,000 (25 per cent completed); Jenkintown to Langhorne, $1,000,000 (30 per cent completed); multiple unit equipment $3,500,000 (15 per cent completed). Foundations for catenary structures, $325,000 (completed).

Removing top of tunnel, Gwynedd Valley, Pa., $135,000 (90 per cent completed). New station, platforms, etc., Chestnut Hill, Pa., $330,000 (started). Reconstruction of Bridge 15-92 carrying Bethlehem pike, Fort Washington, Pa., $150,000 (started). Reconstruction of Bridge 11-95, carrying Old York road, Noble, Pa., $180,000 (started). Electrification from Langhorne, Pa., to West Trenton, N. J., $1,000,000 (10 per cent completed).

Richmond, Fredericksburg & Potomac

Important Work Undertaken: Installation of car retarders, northbound classification yard, Potomac yard, Va., $500,000 (completed). Alterations to northbound receiving yard and extension of southbound receiving yard, Potomac yard, Va., $115,000 (completed).

St. Louis-San Francisco

Important Work Undertaken: New road under construction, Shamrock, Okla., to Dumright, 3.0 miles. Construction of Union station, joint with C. R. I. & P., relocation of main tracks, construction of station tracks and separation of grades at Walker and Robinson avenues, Oklahoma City, Okla., $2,500,000 (75 per cent completed).

St. Louis Southwestern

First Track: Caraway, Ark., to Truman, 15.68 miles, $725,000.
Important Work Undertaken: Grade reduction and line revision, Tyler, Tex., to Corsicana, $2,908,000 (completed).

Sand Springs Railway

Important Work Undertaken: Construction of 17-track storage yard, Sand Springs, Okla., (completed).

Seaboard Air Line

First Track: Near Oviedo, Fla., 2.31 miles.
(Prince George & Chesterfield) Bellwood, Va., to Hopewell, 15.76 miles ($1,000,000).
Second Track: Richmond, Va., to Hermitage, 3.33 miles.
Important Work Undertaken: Extension of Brown street yard and construction of second track to Hermitage, 3.33 miles, Richmond, Va., $250,000 (completed).

Southern

Second Track: Danville, Ky., to Rogers Gap, 55 miles.
Important Work Undertaken: New freight facilities, Durham, N. C., $440,000 (completed). Grade separations at various streets, Greensboro, S. C., $1,000,000 (completed). New coach yard and mill building, Ludlow, Ky., $296,700 (completed). Grade separation, Third street, Louisville, Ky., $110,000 (completed). Construction of second track, Rogers Gap, Ky., to Williamstown, 22 miles (to be completed). Grade crossing eliminations at four streets, Birmingham, Ala., $738,000 (to be completed).

Southern Pacific

First Track: (Pacific lines) Martinez, Cal., to Bernicia Junction, via new bridge, 3.546 miles. Sandia, Cal., to Holtville, 5.775 miles.
Second Track: (Pacific lines). Port Costa, Cal., to Mococo, 8.277 miles. Bridge, Utah, to West Weber, 13.368 miles. Martinez, Cal., to Bernicia Junction, via new bridge, 6.244 miles. Pomar, Cal., to Coyote, 3.30 miles.

Important Work Undertaken: (Pacific lines). Conversion of double-track open-deck Trestles 83-A, 1185 lin. ft., and 83-B, 2190 lin. ft., to ballast deck trestles with concrete fire walls, Davis, Cal., to Sacto, $227,000 (completed). Line changes to reduce curvature, Truckee, Cal., to Floriston, $284,000 (completed). Purchase of water rights and construction of 10.9 miles of 6-in. pipe line, Imlay, Nev., $179,000 (completed). Purchase of water rights and construction of 85,356 lin. ft. of pipe line, Montello, Nev. $200,000 (completed). Construction of 18,582 ft. of new line to reduce curvature, Mt. Shasta-Black Butte, Cal., $319,000 (85 per cent completed).

Additional engine terminal and shop facilities, and tracks, Klamath Falls, Ore., $779,000 (completed). Revision of line to reduce curvature and eliminate 645 lin. ft. of trestles, New Era, Ore., $110,000 (completed). New passenger station, platforms and driveways, Stockton, Cal., $555,200 (completed). Remodel Union station, Portland, Ore., (started). Construction of 30,000 lin. ft. of double track main line and 36,500 lin. ft. of sidings and yard tracks, two bridges and passenger station, San Jose, Cal., $3,279,000 (10 per cent completed). Construction of engine-minal and shop facilities, Taylor Yard, Taylor, Cal., $676,000 (completed). Construction of riprap bulkhead and filling low ground along Los Angeles river, Taylor yard, Taylor, $102,000 (40 per cent completed). Construction of double-track connection with Union Pacific, including concrete arch, Los Angeles, Cal., $433,000 (55 per cent completed). Raising A. T. & S. F. bridge over Los Angeles river to separate grades, Los Angeles, Cal., $121,000 (75 per cent completed).

Grade separation, Sixth avenue, Tucson, Ariz., $199,000 (completed). Revision of line, reconstruction of portals at Tunnels 4 and 5, enlarge Tunnels 6 and 7 and install riprap bank protection between Reuben, Ore., and Union Creek, $126,000 (completed). Reconstruct and extend l.c.l. freight facilities, Oakland, Cal., $334,000 (10 per cent completed). Conversion of double track Trestle 84-A, 3240 ft. long, from open deck to ballasted deck, between Davis, Cal., and Sacto, $186,000 (completed). Construction of a rock-filled dam 90 ft. high across Bonito Creek to provide 332,000,000 gal. water storage, Bonito Creek, N. M., $540,000 (75 per cent completed). Construction of five-story addition to general hospital, San Francisco, Cal., $511,000 (95 per cent completed). Extension to hospital buildings and alterations, Tucson, Ariz., $175,000 (95 per cent completed). Construction of double-track bridge, 5,541 ft. long across Suisun bay, between Martinez, Cal., and Benicia, $12,000,000 (completed). Rehabilitation of Wendel-Alturas line, 100 miles, and construct engine terminal facilities, additional sidings and yards, buildings and other facilities. $1,696,000 (completed).

(Texas and Lousiana lines) New road under construction, extension to Lockport branch, 4.95 miles, Lockport, La., $110,000 (15 per cent completed). Construction of trackage to serve industrial development, Houston. Tex., $106,000 (65 per cent completed). Replacing trestles and raising grade two feet, Barkwell, Tex., $144,600 (completed). Installation of water-treating plants at 19 water stations in Texas, $183,800 (completed). Replacing a 228-ft. draw span at Bridge 5-A with a new span, Houston, Tex., $112,300 (completed). Construction of additional yard tracks and automobile unloading platform, San Antonio, Tex., $114,700 (completed). Development of produce terminal and warehouse, New Orleans, La., $453,600 (50 per cent completed).

Spokane, Portland & Seattle

First Track: Lebanon, Ore., to Sweet Home, 14 miles. Sweet Home, Ore., to Calapooya river, 13 miles.

Important Work Undertaken: Reconstruction of three high trestles (160 ft. high), Portland, Ore., to Keasey, $167,000 (completed). Construction of 27 miles of new road between Labanon, Ore., and Sweet Home $910,000 (in operation, 95 per cent completed).

(Lines Under Survey) Sweet Home, Ore., to Cascadia, 12 miles. Sweet Home to Whitcombs, 8 miles. Lebanon, Ore., to McDowell's Creek, 6 miles. Line up the Calapooya river, 9 miles.

Springfield Terminal Railway

Important Work Undertaken: Construction of three-span steel bridge, Charleston, N. H., $150,000 (completed).

Tennessee, Alabama & Georgia

Important Work Undertaken: Reconstruction and strengthening of all main-line bridges; widening embankments and cuts; general rehabilitation of roadbed, Chattanooga, Tenn., to Gadsen, Ala., 92 miles, $500,000 (70 per cent completed).

Terminal Railroad Association of St. Louis

Important Work Undertaken: Construction of concrete platforms and installation of granite block pavement in four tracks, Union station, St. Louis, Mo., $100,000 (completed). Construction of 8-story reinforced concrete warehouse and mart, with 13-story tower, between Twelfth and Thirteenth streets, and Spruce and Poplar streets, St. Louis, Mo., $3,000,000 (10 per cent completed).

Texas & Pacific

First Track: (Texas Short Line) Grand Saline, Tex., to Van, 11.68 miles. (Texas-New Mexico). Texas-New Mexico state line to Lovington, N. M., 73.48 miles.

Second Track: Browder, Tex., to Nussbaumer, 8.3 miles.

Important Work Undertaken: Construction of second track, Union Terminal Jct., Dallas, Tex., to Browder, 1.3 miles. Construction of engine terminal and shop facilities, Big Springs, Tex., $610,000 (completed). Grade separation, Benton street, Big Springs, $112,000 (completed). New double track steel bridge 2,100 ft. long over Trinity River floodway, Dallas, Tex., $700,000 (90 per cent completed). Replacing two piers and constructing an additional 300-ft. span over Old river, Torras, La., $325,000 (30 per cent completed). Grade separation, Good street, Dallas, Tex., $200,000 (completed).

Elimination of grade crossing, Tennessee street, Ft. Worth, Tex., $110,000 (completed). Elimination of grade crossing, Henderson street, Worth, $400,000 (75 per cent completed). Twelve-story passenger station and office building, Ft. Worth, $1,500,000 (25 per cent completed). Eight-story inbound freight house and storage warehouse, Ft. Worth, Tex., $1,800,000 (25 per cent completed). Water supply pipe line, 12-in., 10-in., in., and 8-in., C. I. pipe, 37 miles long for locomotive water supply, Toyahville, Tex., to Toyah, $500,000 (completed). Additional yard tracks, Bonham, Tex., $130,000 (completed).

Toledo, Angola & Western

Important Work Undertaken: Elimination of grade crossing, Monroe street, Toledo, Ohio, $240,000 (completed).

Toledo Terminal Railroad

Important Work Undertaken: Reconstruction of bridge over Maumee river, Toledo, Ohio, $1,300,000 (completed).

Trinity Valley & Northern

Important Work Projected: New line under survey Cleveland, Tex., to Havens, 12 miles.

Tulsa Union Depot

Important Work Undertaken: Construction of union station, additional passenger tracks, revision of grade and elimination of four grade crossings, Tulsa, Okla., $2,500,000, construction work by St. Louis-San Francisco (90 per cent completed).

Union Pacific System

Second Track: (Los Angeles & Salt Lake) Alhambra avenue to Avenue 18, Los Angeles, Cal., 0.5 mile.

Important Work Undertaken: Construction of new Union passenger station and incidental facilities, Omaha, Neb., $3,400,000 (90 per cent completed). Replacing 3-span bridge over Seventh street with a single span, Omaha, $147,200 (completed). Grade separation, Twenty-seventh street and Creighton avenue, Omaha, Neb., $163,600 (10 per cent completed). Grade separation at Thirty-third avenue to serve Lincoln and Meridian highways, and construct 10,187 ft. of siding, Columbus, Neb., $230,000 (40 per cent completed).

Addition to yard and additional yard facilities, grade separation and bridge for 17 tracks over Crow Creek, Cheyenne, Wyo., $1,886,000 (5 per cent completed). Improvement in the treating plant and additional treating equipment, Laramie, Wyo., $100,000 (90 per cent completed).

(St. Joseph & Grand Island) Construction of combination passenger and freight station, and driveways, and rearrangement of tracks, Fairbury, Neb., $100,000 (completed).

(Oregon Short Line) Construction of combination warehouse, mill and elevator and tracks and incidental facilities, Salt Lake City, Utah, $225,000 (75 per cent completed). Extension of power house and installation of one 668-hp. boiler with auxiliaries, Pocatello, Idaho, $165,000 (completed).

(Oregon-Washington Railroad & Navigation Company). Construction of two-story passenger station and office building and incidental facilities, La Grande, Ore., $128,000 (completed). Construction of 3,409 ft. new line, including one 550-ft. double-track tunnel, concrete lined, Chatfield, Ore., $185,700 (48 per cent completed).

(Los Angeles & Salt Lake) New road under construction. Boulder Junction, Nev., to Summit, 22.7 miles. Grade crossing elimination Ninth and Lemon streets, Los Angeies, Cal., $238,000 (5 per cent completed).

Construction of a reinforced concrete viaduct spanning the Los Angeles river and over the track of the A. T. & S. F. and L. A. & S. L. railways, Los Angeles, L. A. & S. L. proportion $520,000 (10 per cent completed). Reinforced concrete viaduct over Los Angeles river and the A. T. & S. F. and L. A. & S. L. tracks, Fourth street, Los Angeles, L. A. & S. L. proportion, $395,000 (60 per cent completed). Construction of additional unit, freight house at Hunter and Alameda streets, Los Angeles, $288,000, (completed). Grade crossing elimination, Spence street, San Pedro branch, Hobart, Cal., $142,000 (15 per cent completed). Replacing two-span bridge over Whittier boulevard with a single span 165 ft. long, Whittier, Cal., $100,000 (completed). Grade separation, State highway, Wineville, Cal., $165,000 (completed). Enlarging tunnel No. 4 to standard double-track section and line throughout, Kyle, Nev., $502,500 (5 per cent completed). Enlarge Tunnel 6 to standard double-track section and line throughout, Stine, Nev., $200,500 (completed).

Important Work Projected: Six-story warehouse, Ninth and Alameda streets, Los Angeles, Cal., $800,000.

Union Terminal Company

Important Work Undertaken: Grade crossing elimination, including rearrangement of tracks and facilities, Cadiz street, Dallas, Tex., U. T. proportion $150,000 (completed).

Utah Railway

Second Track: Utah Railway Junction, Utah, to Martin, 0.91 mile.

Virginian

First Track: From M. P. 19, Itman branch to Baileysville, W. Va., 7 miles.

Important Work Undertaken: New road under construction, Baileysville, W. Va., to Gilbert, 18.4 miles. New connection with Kanawaha & Michigan, 1.04 miles, Deepwater, W. Va. Replacing timber trestles with permanent structures, Long Island, Va., to Taber, $120,000 (completed).

Wabash

Important Work Undertaken: Replacing Bridge 747, Danville, Ill., $462,200 (completed). Grade separation, Western avenue, Chicago, $352,700 (completed). Elimination of grade crossing, Brush College road, Decatur, Ill., $233,000 (completed). Reconstruction of Bridge 499, Brunswick, Mo., $141,600 (80 per cent completed). Separation of grades, Union and Lindell avenues, St. Louis, Mo., $299,000 (80 per cent completed). Construction of new bridge over Missouri river, St. Charles, Mo., $5,500,000 (5 per cent completed). Additional improvements, Wabash elevator, North Kansas City, Mo., $299,300 (completed).

Western Maryland

Important Work Undertaken: Construction of ore-handling facilities, Port Covington, Md., $472,000 (completed). Replacing various bridges with heavier structures, $115,000 (40 per cent completed).

Western Pacific

Important Work Undertaken: Construction of 111.86 miles of single-track main line and 22 miles of sidings, Keddie, Cal., to Bieber, to connect with Great Northern, $9,800,000 (0.5 per cent completed). Widening and strengthening roadbed, Portola, Cal., to Wendover, Utah, 247 miles, $400,000 (80 per cent completed). Lengthening passing sidings at various points, $165,000 (completed). Rehabilitation of roadbed and track, Stockton, Cal., to Sacramento, $350,000 (completed).

Railway Construction in Canada

Canadian National

First Track: Lake Verde, P. E. I. to Pisquid, 10 miles. Sunny Brae, N. S., to Guysborough, 20 miles. Mawer, Sask., southwesterly, 50.2 miles. Hamlin, Sask., to Glenbush, 31.8 miles. Melfort, Sask., to Aberdeen, 3.6 miles. Neidpath, Sask., to Swift Current, 10 miles. Ridgedale, Sask., easterly, 0.86 mile. Hemaruka, Alta., to Scapa, 5 miles. In Lulu St. Walburg, Alta., to Bonnyville, 20.17 miles. Alliance, Alta., southeasterly, 0.86 miles. Hemaruka, Alta., to Scapa, 5 miles. On Lulu Island, B. C., 3.38 miles.

Important Work Undertaken: New passenger station, Halifax, N. S. (completed). Construction of new hotel, Halifax (completed). Renewing superstructure, ferry ships, Point Tupper and Mulgrave, N. S., to carry Coopers E-60 loading (completed). Construction of new hotel at Charlottetown, P. E. I. (to be completed in 1931). Reconstruction of Murray Harbor and Vernon subdivisions to standard gage, P. E. I. (completed). Construction of foundry, oil storage, garage and firing up and inspection shop, new locomotive shops, Montreal, Que. (completed). Construction of new passenger station, Hamilton, Ont. (to be completed in 1931). Construction of 3.31 miles of spur track to new elevator, Kingston, Ontario (completed). Extension to Chateau Laurier, Ottawa, Ont. (completed). Construction of new fruit facilities, temporary express facilities, new local freight house and extension of passenger tracks and platforms, St. Bonaventure station area, Montreal, Que. (to be completed in 1931). Construction of a spur track, St. Eustace, Que., to Oka (to be completed in 1931). Construction of a new storage yard, Montreal East, Que. (completed). Construction of 400 ton mechanical cooling plant, icing facilities and additional yard tracks, Mimico, Ont. (completed).

Alterations and extension to pier, Vancouver, B. C. (to be completed in 1931). Construction of a new storage yard, Montreal East, Que. service (completed). Filling False Creek for future terminal facilities (completion indefinite). Replacing Bridge 87.1, Regina division, Sask., with permanent structure (completed). Reconstruction of Bridge 78.8, Kamloops division, B. C. (completed). Elimination of grade crossing Pembina highway, Winnipeg, Man. (to be completed in 1931). Extension to storage warehouse, Winnipeg (completed). Elimination of grade crossing, Ninety-seventh street, Edmonton, Alta. (completed). Construction of new 595-room hotel, Vancouver, B. C. (to be completed in 1932). Additional staff buildings, additional equipment and continuation of landscaping, Jasper Park Lodge, Jasper Park, Alta. (completion indefinitie).

Construction of a new freight line cutoff, Regina, Sask. (to be completed in 1931). Construction of a new 260-room hotel, Saskatoon, Sask. (to be completed in 1931). Replacing Bridge 80.6 with a permanent structure and revising alinement, Albreda subdivision (completed). Alterations and improvement to dock, Inner Harbor terminal, Victoria, B. C. (completed). Construction of 6-story warehouse, Montreal, Que. (completed).

Reconstruction of Bridge 87.9 over Becancour river, Sorel subdivision, P. Q. (to be completed in 1931). Construction of new freight shed, Mission, Man. (to be completed in 1931). Construction of reinforced concrete subway and revision of alinement to eliminate grade crossing, St. Clair avenue, Toronto, Ont. (to be completed in 1931). Construction of new terminals, Montreal, Que. (completion indefinite). Track elevation between Bathurst street and Logan avenue, Toronto, Ont., joint with Canadian Pacific (to be completed in 1931). Grade crossing elimination, La Canardiere, road Limoilu, Que. (to be completed in 1931).

Elimination of grade crossing, West street, Brantford, Ont. (to be completed in 1931). Elimination of grade crossing, Simcoe street, Oshawa, Ont. (to be completed in 1931). Elimination of grade crossings and construction of new station, London, Ont. (started). Austin-Amherst grade crossing elimination, Black Rock, Buffalo, N. Y., joint with other railways (completion indefinite). Construction of spur track to serve elevator, Sorel, Que. (to be completed in 1931). Construction of new passenger station, Saskatoon, Sask. (completion indefinite). Construction of line from St. Walburg, Sask., to Bonnyville (grading completed 4 miles). Construction of line, Bulwark, Alta., easterly (18 miles of grading completed).

Canadian Pacific

First Track: Archive, Sask., to Wymark, 38.9 miles (completed). Asquith, Sask., to Cloan, 14.3 miles (grading completed and track laid). Dunelm, Sask., southwesterly, 25 miles (grading completed). Fife Lake, Sask., westerly 25 miles (grading completed and 3 miles of track laid). Hamlin, Sask., to Shellbrook, 25 miles (started). Medstead, Sask., northeasterly, 35 miles (started). Rosetown, Sask., southeasterly, 18 miles, (started). Tuffnell, Sask., to Prince Albert, 70.8 miles (grading 37 per cent completed, 50.3 miles of track laid).

Crossfield, Alta., northwesterly, 27.9 miles, (grading completed and track laid). Prince Albert, Alta., to Lac la Biche, 94 miles (grading 85 per cent completed). Suffield, Alta., to Blackie 22.34 miles (completed). Coronation, Alta., to Youngstown, 39.6 (track laid). Bulwark, Alta., to Berkinshaw, 14.5 miles (grading completed and track laid). Vanguard, Alta., to Meyronne, 30 miles (grading 56 per cent completed). Wolfe's Cove branch, P. Q., 1.5 miles (grading completed, 0.5 mile of track laid). Kootenay Landing, B. C., to Proctor, 34.6 miles (grading completed and track laid).

(Lacombe & Northwestern), Alta., 20.3 miles (grading completed and track laid).

Second Track: Sudbury, Ont., to Azelda, 7.10 miles.

Important Work Undertaken: Construction of Lakeside Inn, 55-room hotel and 5 cottages, Yarmouth, N. S., $415,000 (10 per cent completed). Construction of New Cornwallis Inn, 100 rooms, Kentville, N. S., $700,000 (completed). Construction of quarters for help, New Pines hotel, Digby, N. S., $135,000 (50 per cent completed). Construction of club house for Canadian Pacific Amateur Athletic Association, Montreal, Que., $120,000 (50 per cent completed). Replacing terra cotta facing with Indiana limestone, office building, Toronto, Ont., $370,000 (completed). Terminal improvements, Toronto, Ont., $3,000,000 (60 per cent completed). Alterations and additions to Royal Alexandra hotel, Winnipeg, Man., $100,000 (completed). Construction of garage and stables, Chateau Lake Louise, Lake Louise, B. C., $118,000 (completed). Extension to Royal York hotel, 170 rooms, Toronto, Ont., $1,190,000 (completed). Extension of terminal facilities, Quebec, P. Q., $1,300,000 (20 per cent completed).

Northern Alberta Railways

First Track: Grande Prairie Branch, M. P. 88.8 to M. P. 138.8, Alberta, 50 miles. Peace River branch, M. P. 98.2 to M. P. 113.8, Alberta, 15.6 miles.

Pacific Great Eastern

Important Work Undertaken: Revision of alinement through Lillooet, B. C., 5 miles, including a bridge over the Fraser river and the construction of terminal facilities, $600,000 (17 per cent completed).

Roberville & Saguenay

First Track: Arvida, P. Q., to Kenogami, 2.95 miles, $200,000.

Temiskaming & Northern Ontario

First Track: Coral Rapids, Ont., to Moose river, 45 miles.

Important Work Undertaken: New road under construction, Moose river, Ont., to Moose Factory, 45 miles.

Toronto, Hamilton & Buffalo

Important Work Undertaken: Construction of new engine terminal, Hamilton, Ont., $1,200,000 (completed). Replacing bridge over Chippewa river with double-track bridge, Welland, Ont., $128,000 (75 per cent completed). Revision of alinement and elevation of tracks for flood prevention, Dundas branch, Hamilton, Ont. (completed).

Railway Construction in Mexico

Mexican Pacific

First Track: Kilometer 7 to end of line, Sinaloa, Sin., 3.75 miles.

National Railways of Mexico

First Track: Mexico-Tampico Short Line, 8 miles. Gulf Coast Line, Tampico to Vera Cruz, 8 miles. Line Calles to Guerrero, 46.7 miles.

Important Work Undertaken: Mexico-Tampico Short Line, 333.7 miles (22.9 per cent completed, 48 miles in operation). Gulf Coast Line, Tampico to Vera Cruz, 312.8 miles (16.7 per cent completed, 48 miles in operation). Line Calles to Guerrero, 78.7 miles (95 per cent completed, 78.7 miles in operation). Construction of locomotive and car repair shops, Monterey, N. L. (80 per cent completed).

Important Work Projected: New lines authorized: Empalme de el Oro to Sierra Mojada. San Carlos to Villa Acuña. El Salto to Mazatlan (Durango to Mazatlan extension).

(New Lines Under Survey). Soledad to Puerto de Tuxpan (surveys completed). Aristeo to Apatzingan (surveys completed).

(New Lines Projected). Sierra Mojada to Jimenez. Zacaticas and Berriozabal to La Honda. Rosario to Inde. Inde to Descubridora. Indes to Tepehuanes. Tepehuanes to Guanacevi. Puerto Mexico and Sta. Lucrecia to Campeche. Balsas to Acapulco. Tehuacan and Tezonapa to Rio Blanco. Coapa to Coyuca. Balsas to Zihuatanejo. Ejutla to Puerto Angel, 75 miles. Tlacolula to Tehuantepec.

Southern Pacific

Important Work Undertaken: Replacing pile trestle approaches with permanent construction, bridge over Santiago river, Ocotlan, Jal., $515,400 (completed).

* * * *

A 65-ft. Gondola Car Built for the Delaware, Lackawanna & Western by the Magor Car Corporation

Market Losses; Few Stock Issues Mark

RAILWAY FINANCES IN 1930

By J. G. Lyne
Financial Editor
Railway Age

Gloom has dominated for most of the year, but many favorable potentialities lie ahead—Most dividends maintained

THAT the year just past has been one of tumbling prices no one needs to be told. An examination of the extent of the decline, however, and its momentary upward and downward vagaries is, nevertheless, instructive as charting the course of an economic phenomenon of painful importance to all of us.

The *Railway Age* index of the average price of twenty leading railroad stocks on December 16 stood at 76.63 (although this was followed by a sharp recovery on the following day), as compared with 127.39 at the beginning of the year, a decline of 39 per cent. From the high point, 164, attained by this index in September, 1929, the decline to December 16 last was 47 per cent.

With bond prices, naturally, the picture is somewhat less spectacular. The average price of twenty leading railway bonds on December 16 was 89.44, as compared with 92.81 at the beginning of the year and 89.15 when the stock market boom was at its height in October, 1929. In spite, however, of the fact that the bond market has held its own much better than that of stocks, its movement has been keenly disappointing. In the summer it began a steady upward trend which was maintained until the last week in September when the index reached the high point of 96.18. Since a rising bond market usually precedes rising stock prices, this trend was taken as a favorable indication for the early future of business. However, with the outbreak of revolutionary disturbances in several countries, foreign bonds took a downward course and domestic issues fell in sympathy. The improving market of the late summer and early fall did, however, give a fillip to financing and heavy sales of new issues of bonds and equipment trust certificates occurred during that period.

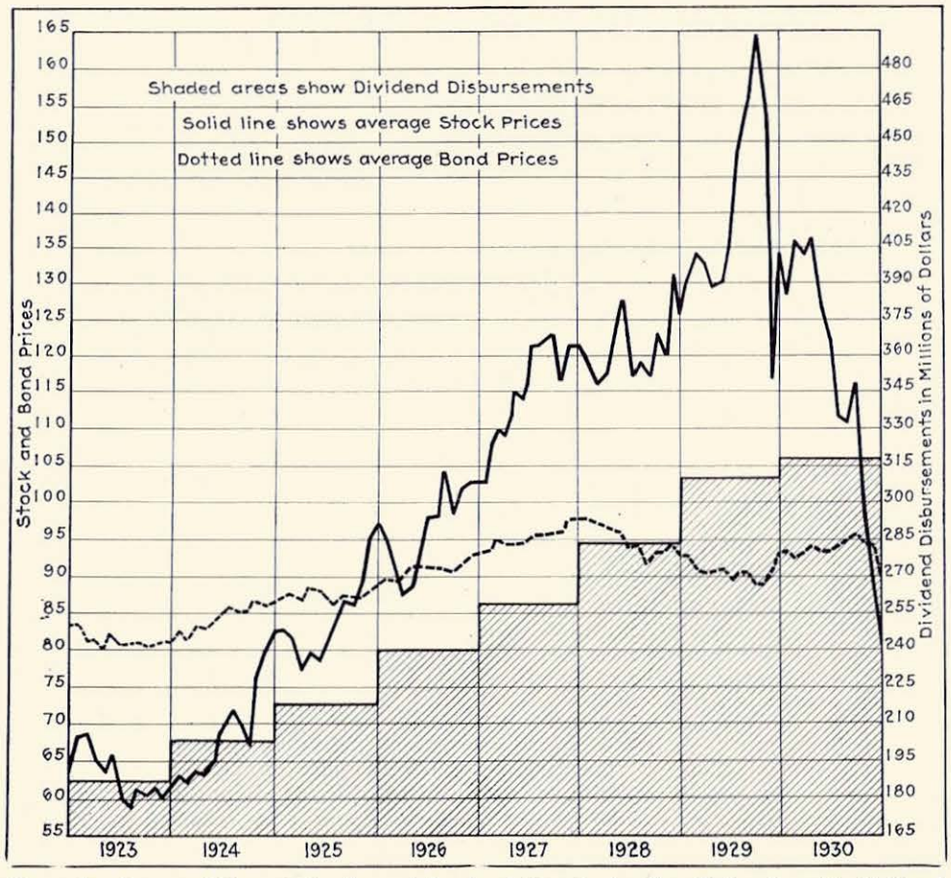


Chart A—Average Prices of Stocks and Bonds of Twenty Leading Railroads, with Dividend Disbursement Charges Shown on the Same Relative Scale

1930 Dividend Payments estimated

The Wall Street Journal publishes regularly average prices of representative stocks, not only of railroads but of industrials and utilities as well. Its average of representative railroad stocks is on a somewhat higher scale than that of the *Railway Age*, having started the year at 145, whereas that of the *Railway Age* at the same time stood at 127. The Wall Street Journal's index on December 15 had declined to 93.6, or 35 per cent. Meantime its index of industrial stocks declined from 248 at the beginning of the year to 163 on December 15, or 34 per cent; and utility stocks from 88 to 57, or 35 per cent. The railways have thus, apparently, held their own fairly well from a comparative standpoint.

On the other hand, as was pointed out in the Annual Review Number a year ago, railway stocks never soared

so high in the market boom as did the industrials. Railroad stock prices, according to the Wall Street Journal's averages, in 1929 ranged from a high point of 189 to a low of 128. Industrial stocks, on the other hand, reached a peak of 381 in 1929 and a low of 199. Comfort could be taken at the end of 1929 that railroad shares, while they had not skyrocketed with the industrials, at least were no lower in price at the end of that year than at the beginning; whereas industrial stocks were about 12 per cent less. This year the picture is not so pleasant, since the market's appraisal of the railways has shown practically the same shading as that of the industrials.

An enterprise might not be embarrassed by a failure of its shares to bound upward in boom times if it could be assured that they would not decline with the rest in times of economic quiescence. That they should not soar when others soar, but must sag with them is

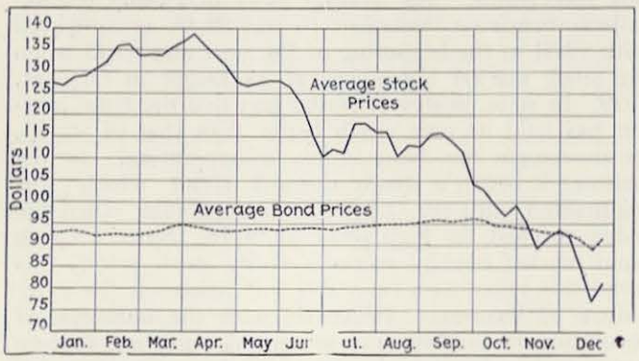


Chart B—Fluctuations in Average Price of Twenty Leading Railway Stocks and Twenty Leading Railway Bonds in 1930

one of the indications that the present railroad situation is *not* due solely to the depression—the allegation that it is so to be accounted for being made by those who would deny the railways' plea that they be placed upon a basis of economic equality of opportunity with their competitors. That the railways have done as well as they have, their handicaps being what they are as compared with the freedom from regulation and taxation and virtual subsidy enjoyed by their competitors, affords conclusive evidence of their conservative financial structure and their high standard of efficiency.

Chart A shows the *Railway Age* average of stock and bond prices of 20 leading railroads during the past eight years, with dividend disbursements of these same railroads plotted on the same relative scale. It will be seen that, whereas from 1925 onward stock prices outstripped dividends in their rate of increase, during 1930 the situation was largely corrected. Dividend payments were maintained—even slightly increased—whereas stock market prices dropped down into the area showing the total of dividend disbursements.

Table I—Comparison of Dividends and Taxes, 1911 to 1929

Year Ended June 30	Dividends*	Proportion of net Income Paid in Dividends	Taxes*
1911	$397,068,724	81	$98,626,848
1912	339,964,855	85	109,445,407
1913	322,300,406	66	118,386,859
1914	376,098,785	108	135,572,579
1915	259,809,520	82	133,276,330
1916	281,936,371	47	145,517,034
Year Ended December 31			
1916	306,176,937	47	157,113,372
1917	320,395,779	53	213,920,095
1918	275,336,547	71	223,175,379
1919	278,516,908	62.5	232,601,397
1920	271,731,669	63	272,061,453
1921	298,511,328	95	275,875,990
1922	271,573,751	73	301,034,923
1923	296,127,048	53	331,915,459
1924	320,429,767	57	340,336,686
1925	342,020,885	49	358,516,046
1926	399,243,963	49	388,922,856
1927	411,581,093	61	376,110,250
1928	430,677,138	55	389,432,415
1929	490,125,673	55	396,682,634

* Not including switching and terminal companies.

This is a natural development, since dividends in the case of many roads were in 1930 paid out of surplus, which cannot be continued indefinitely unless there is a revival in earnings. Such a revival could come from an upturn in general business or definite progress in placing the railroads on a more equitable competitive basis with other forms of transport. Unless the railways are unfortunate indeed, both these favorable developments ought to come in 1931. The former—a revival in general business—hinges on factors beyond the control of any one group. The latter—progress in placing the railways on a better competitive footing—lies squarely at the door of our industrial and political leaders. Along with their responsibility goes also the effort being made by the railways to compose differences among themselves which may be harmful to the industry and to organize intelligently to secure vigorous public support. The observer of tendencies in the stock market during the coming year will probably find developments in this latter sphere to have quite as much bearing on future market trends of railway securities as the ups and downs of general business.

Another factor which may have a considerable bearing on future stock prices is increased activity on the part of railway security owners to learn and disseminate the facts about the railroad situation and exert intelligent effort toward correcting whatever evils they may find. Of such activity may be mentioned that of the National Association of Owners of Railway and Public Utilities Securities in arranging for the discussion of railway problems in various population centers. Another is the vigorous and intelligent railroad protagonism recently manifest by one of the investment trusts which specializes in railway securities. If other investment trusts and large holders of railway securities generally should follow these admirable examples the results could not be otherwise than extremely helpful. Such developments are of great potential significance; they should be followed closely by those who would be *au courant* with the railroads' financial future. Again, the Interstate Commerce Commission and other regulatory and legislative bodies will be watched with interest for any signs of a more liberal attitude toward the railways—any development of which would certainly be reflected in more favorable market trends. Professor William Z. Ripley in an address in New York on December 18 called attention to the fact that the railways have in the past gone through crises quite as severe as this one; and that it is precisely such a crisis which is needed to draw the attention of the public to the problem, gaining their support for efforts made to solve it.

Dividend Changes

Changes in dividends during the year were not as marked as changes in earnings and market prices. Extra dividends and dividend increases were, for the most part, those of subsidiary companies, declared in order to put parent companies in funds to meet their requirements. The most notable of these were the extra dividends declared out of surplus by a number of companies in which the Southern has large holdings, placing the latter company in position after adding its

own earnings not only to meet its 1930 dividend requirements but also a part of those of 1931. The Burlington declared an extra dividend of 5 per cent, adding to the income of the Great Northern and Northern Pacific. The Ann Arbor by an initial payment of $6 on common and $5 on preferred and an extra of $27 on common made a substantial contribution to the treasury of the Wabash.

The Missouri-Kansas-Texas established a 4 per cent dividend basis on its common stock as did the Boston & Maine. The Norfolk & Western changed from an 8 per cent per annum basis to 10. Its usual extra dividend was $2, however, instead of $4 as in 1929, so the basis of return to shareholders was unchanged. The Wheeling & Lake Erie made great progress in clearing up arrearages in dividends on its 7 per cent prior lien stock, back payments covering the period from November, 1929, to August, 1924, having been made.

The Chicago & North Western changed from a 6 per cent basis to 4 per cent (in 1929 payments aggregated 5 per cent) on its common stock. The Buffalo, Rochester & Pittsburgh on July 31 voted to omit its common dividend. The Lehigh Valley, while maintaining its regular dividends, omitted the extra of $1 usually declared in December. The Delaware, Lackawanna & Western likewise omitted its usual extra.

These and other changes are noted in greater detail in the following partial list of dividend fluctuations:

Alabama Great Southern.—This company declared a special dividend of 12 per cent and an extra dividend of 3 per cent a share on its preferred and common stock, in addition to the customary semi-annual dividends on each of the stocks.

Ann Arbor.—The directors of this company in June declared an initial annual dividend of $6 a share on common stock and $5 a share on the 5 per cent non-cumulative preferred stock. In December another dividend of $27 on the common stock was declared out of surplus.

Augusta & Savannah.—An extra dividend of ¼ of 1 per cent was declared by the directors of this company in June.

Boston & Maine.—The directors of this company declared a $1 dividend on the common stock in March, placing it on a 4 per cent per annum basis. This was the first distribution on the issues since 1913.

Buffalo, Rochester & Pittsburgh.—On July 31 the directors of this company voted to omit the semi-annual dividend of $2 a share on the common stock.

Central of New Jersey.—The directors of this company in January and June declared an extra dividend of 2 per cent.

Chesapeake & Ohio.—In August the directors declared an initial dividend of 62½ cents per share on the new $25 par common stock, placing it on a $2.50 annual basis, which is equivalent to the $10 annual rate formerly paid on the $100 par common stock before the 4 to 1 split-up.

Chicago & North Western.—In February the directors of this company placed the common and preferred stock of this company on a quarterly dividend basis, 1¼ per cent on the common and 1¾ per cent on the preferred, previously the company paid semi-annual dividends of 2½ per cent on the common and 3½ per cent on the preferred. In November the rate was changed to $.25 a share placing the stock on a $4 annual basis.

Chicago, Burlington & Quincy.—On December 4 the directors of this company declared an extra dividend of 5 per cent on outstanding capital stock. This was the first extra dividend declared since 1921.

Chicago, Indianapolis & Louisville.—An extra semi-annual dividend of 1 per cent on the common stock was declared by the directors of this company on June 11.

Cincinnati, New Orleans & Texas Pacific.—The directors of this company on November 18 declared an extra dividend of 50 per cent on the common stock.

Cleveland, Cincinnati, Chicago & St. Louis.—This company in April declared a semi-annual dividend of $5 a share on common stock, placing the issue on a $10 annual basis instead of $8 as previously paid.

Georgia, Southern & Florida.—In November the directors of this company voted to omit the semi-annual dividend of $2.50 per share due on the participating and non-cumulative 2nd preferred stock.

Hocking Valley.—The directors of this company in April declared a special dividend of 6¼ per cent on the capital stock, payable May 10.

Kansas, Oklahoma & Gulf.—The directors of this company in May declared an initial semi-annual dividend of 3 per cent on the series B 6 per cent non-cumulative preferred stock.

Lehigh & Hudson River.—This company on December 31, 1929, paid an extra dividend of 4 per cent on capital stock.

Maine Central.—On February 28 the directors of this company declared a quarterly dividend of $1.25 a share on common stock, placing the issue on a $5 annual basis compared with the $4 rate previously paid.

Maryland & Pennsylvania.—The directors of this company in April declared an initial dividend of $4 a share and in October a $2 dividend was also declared.

Michigan Central.—The directors of this company on June 19 declared a semi-annual dividend of 25 per cent on outstanding capital stock. Previously the company paid semi-annual dividends of 20 per cent and, in addition, in March, 1929, paid a cash dividend of 100 per cent.

Missouri-Kansas-Texas.—This company in May declared an initial $1 dividend on its common stock, placing it on a $4 annual basis. This was the first dividend to be declared by this company since its reorganization in 1922.

Nashville, Chattanooga & St. Louis.—An extra dividend of 1 per cent was paid by the directors of this company in February and in July a semi-annual dividend of 2½ per cent was declared. This is equivalent to an $8 annual rate on stock outstanding prior to the 60 per cent stock distribution made on February 15 1930, and compares with a dividend rate of $7 previously paid.

Norfolk & Western.—The directors of this company declared a quarterly dividend of $2.50 on common stock, raising the rate from $8 per share per annum to $10. In October an extra dividend of 2 per cent on this stock was also declared.

Peterborough R. R.—This company on April 1 paid a semi-annual dividend of 1¾ per cent on the capital stock. Previously the company paid semi-annual dividends of 2 per cent each.

Richmond-Washington.—This company in April paid an extra dividend of 4½ per cent on its capital stock.

Rutland.—A dividend of 2 per cent on preferred stock was declared by this company in April and September. A similar dividend was paid in October, 1929, the last previous payment being a 1 per cent dividend in December, 1928.

St. Louis-Southwestern.—The directors of this company on November 21 voted to omit the regular quarterly dividend of $1.25 a share on the 5 per cent preferred stock.

Wabash.—The directors of this company declared a dividend of $10 a share on Class B preferred stock on account of arrearages; this dividend covered the years 1928 and 1929.

Western New York & Pennsylvania.—A 4 per cent dividend on the common stock ($50 par) of this company was declared by the directors in January, also a 5 per cent dividend on the 5 per cent non-cumulative preferred ($50 par). These were the first dividends to be declared since recapitalization.

West Jersey & Seashore.—The directors of this company in March, declared a semi-annual dividend of 3 per cent. For the periods between October 15, 1927, and October 15, 1929, semi-annual dividends of 2½ per cent were paid.

Wheeling & Lake Erie.—In February the directors of this company declared a dividend of 5¼ per cent on the 7 per cent prior lien stock of this company covering the period from November 1, 1921, to August 1, 1922; in June a 7 per cent dividend was declared to cover the period from August 1, 1922, to August 1, 1923, and on October 8 a further dividend of 7 per cent was declared covering the period from August 1, 1923, to August 1, 1924.

Table II—Partial List of Securities Issued in 1930—Stock

Road	Amount	Terms
Boston & Maine	$7,500,000	Prior Preference Stock offered in exchange on equal terms for mortgage bonds.
Chesapeake & Ohio	18,152,400	Common Stock offered for sale pro rata to stockholders, at par, at rate of one new share for each share held.
Chesapeake & Ohio	191,528,367	Common stock of par value of $25 offered in exchange for equal amount of existing $100 par common stock and 6½ per cent cumulative convertible preferred stock, series A, at rate of four shares of new for one share of old stock.
Grand Trunk Western	4,663,607	$25 par value common stock amounting to $6,184,002 and $2,651,546 of 6 per cent cumulative of $100 par value, delivered to Canadian National in satisfaction of indebtedness.
New York Central	7,500,000	Capital stock offered at $130 a share to officers and employees who have been in service of the company for two or more years.
Pennsylvania	18,000,000	Capital stock of $50 par value offered to officers and employees of the company who have been in service of the company for at least 6 months.
Canadian Pacific	330,000,000	Common stock of $25 par value exchanged 4 shares for one for $100 par stock.
Chesapeake & Ohio	20,142,200	Offered for sale pro rata to common stockholders at $100 par at rate of one new share for each share held.

Bonds

Road	Maturity	Amount	Rate Int.	Sold to Banker Price	Sold to Banker % Cost	Offered to Public Price	Offered to Public Yield	Offered by
Akron, Canton & Youngstown, Mtge., Series B	1945	$1,500,000	5½	96.375	5.87	99.75	5.5	Otis & Co., Guardian Trust Co. (Cleveland) Coffin & Burr, Inc.
Algers, Winslow & Western, 1st Mtge.	1940	250,000	6	95.	7.166	....	.	Guardian Trust Co.
Aroostook Valley, 1st and Ref. Mtge., Series A	1954	1,000,000	5½	94	5.97	....	..	
Baltimore & Ohio Conv. Gold Bonds	1960	63,031,000	4½	95	4.984	95	..	Offered to common and preferred stockholders of record, Feb. 3, 1930, to extent of 20 per cent of holdings. Issue underwriten at fee of 2½ by Kuhn, Loeb & Co., Speyer & Co. and Natl. City Co.
Boston Terminal, 1st Mtge.	1950	1,163,000	4	99.09	4.07	100	..	Lee Higginson & Co., First Natl.-Old Colony Corp. (Boston).
Boston & Albany, Guar. Imp. Mtge., 1928	1973	5,700,000	4¼	....	...	93	4.6	J. P. Morgan & Co., First Natl. Bank and National City Co.
Boston & Maine, 1st Mtge.	1955	15,000,000	5	98	...	100.50	4.96	Kidder Peabody & Co., Lee Higginson & Co., Harris Forbes & Co., First Natl.-Old Colony Corp.
Canadian National, Guaranteed	1970	18,000,000	5	....	...	99.50	..	Offered by syndicate headed by Dillon Read & Co., and nine other American and Canadian bankers.
Canadian National, 25 yr. Gold	1955	50,000,000	4¾	....	...	99	..	Sold to syndicate headed by Chase Securities Corp.
Canadian Pacific, Coll. Trust Gold	1960	25,000,000	4½	...	...	98	4.62	National City Co., and six other American and Canadian bankers.
Chesapeake & Ohio, Ref. and Imp. Mtge., Series B	1995	35,088,000	4½	91.5	4.938	94	4.80	J. P. Morgan & Co., Kuhn, Loeb & Co., First Natl. Bank, Natl. City Co., Guaranty Co. of N. Y.
Chicago & North Western, Gen. Mtge. Gold	1987	5,031,000	4¾	....	...	103	4.60	Kuhn, Loeb & Co., and National City Co.
Chicago & North Western, 1st and Ref. Mtge., Series C	2037	12,000,000	4½	97.5	4.62	...	..	Kuhn, Loeb & Co.
Chicago, Indianapolis & Louisville, 1st and Gen. Mtge., Series A	1966	1,000,000	5	101.75	4.9	102.75	..	Potter & Co., and Harris, Forbes & Co.
Chicago, Milwaukee, St. Paul & Pac., Gen. Mtge., Series F	1989	15,000,000	4¾	98	4.85	100.50	..	Kuhn, Loeb & Co., and Natl. City Co.
Chicago, Rock Island & Pacific, Conv.	1960	32,228,000	4½	95	4.98	95	..	Offered to stockholders to extent of 25 per cent of holdings. Issue underwritten by Speyer & Co., Natl. City Co. and J. W. Seligman at fee of 2½ per cent.
Cincinnati Union Term., Guar. 1st Mtge., Series A	2020	12,000,000	4½	....	...	102.25	4.39	J. P. Morgan & Co., First Natl. Bank, Kuhn, Loeb & Co., and National City Co.
Cleveland & Pittsburgh, Gen. and Ref. Mtge.	1977	7,182,000	4½	....	...	100.50	..	Kuhn, Loeb & Co.
Cleveland, Cinn. Chic. & St. Louis, Ref. and Imp., Series E	1977	24,000,000	4½	....	...	98	4.60	J. P. Morgan & Co., First National Bank, Guaranty Co. of N. Y.
Cleveland Union Term., Guar. 1st Mtge., Series C	1977	18,000,000	4½	....	..	98	4.60	J. P. Morgan & Co., First National Bank, National City Co.
Colorado & Southern, Gen. Mtge., Series A	1980	20,000,000	4½	93	4.875	95.25	4.75	J. P. Morgan & Co., First National Bank, National City Co.
Delaware, Lackawanna & Western, Guar. Cons. Mtge., Series A (Morris & Essex)	1955	10,000,000	5	101.25	4.914	103.5	4.76	J. P. Morgan & Co.
Delaware, Lackawanna & Western, Cons. Mtge., Series B. (Morris & Essex)	1955	15,000,000	4½	94.25	4.895	96.5	4.73	J. P. Morgan & Co.
Delaware & Hudson Corp., 1st and Ref. Mtge., Gold	1943	10,000,000	4	90.5	5.002	93	4.73	Kuhn, Loeb & Co. and 1st Natl. Bank
Erie, Ref. and Imp. Mtge., Series A	1975	50,000,00	5	93.5	5.385	95.5	5.25	J. P. Morgan & Co., First National Bank and National City Co.
Great Northern, Gen. Mtge., Series E	1977	10,000,000	4½	95	....	97	4.65	J. P. Morgan & Co., First National Bank and National City Co.
Gulf, Mobile & Northern, 1st Mtge., Series C	1950	3,000,000	5	97	5.24	99.5		Kuhn, Loeb & Co.
Louisiana & Arkansas, 1st Mtge., Series A	1969	13,000,000	5	....	...	92	5.50	Dillon Read & Co. and nine other bankers.
Louisville & Nashville, 1st and Ref. Mtge., Series C	2003	15,000,000	4½	92.5	4.875	95	4.74	J. P. Morgan & Co.
Louisville & Nashville, Unified	1940	5,000,000	4	92.5	4.96	94.5	4.65	J. P. Morgan & Co.
Michigan Central, Ref. & Imp. Mtge., Series C	1979	7,634,000	4½	....	...	98.5	4.55	J. P. Morgan & Co., First National Bank and National City Co.
Minneapolis, St. Paul & Sault Ste. Marie, 1st Ref. Mtge., Series B	1978	4,106,000	5½	96.5	5.71	99	..	Dillon Read & Co., National City Co., Lane Piper & Jaffray, Inc., First Securities Corp., and Bane-Northwest Co.
Missouri Pacific, 1st and Ref. Mtge., Series H	1980	25,000,000	5	97.75	5.125	100.25	..	Kuhn, Loeb & Co.
N. Y., Chicago & St. Louis, Ref. Mtge., Series C	1978	36,000,000	4½	95.25	4.752	97.75	4.6	Guaranty Co. of N. Y., Harris Forbes & Co., Dillon Read & Co., Lee Higginson & Co.
N. Y., Chicago & St. Louis, Ref. Mtge., Series C	1978	12,000,000	4½	95	4.765	97.50	4.63	Guaranty Co. of N. Y., Lee Higginson & Co., Harris Forbes & Co., Dillon Read & Co.
New York, New Haven & Hartford, 1st Mtge., Series C	1950	1,250,000	4½	99.214	4.56	99.88	4.51	Paine, Weber & Co. (Boston).

Important Work Undertaken: (Pacific lines). Conversion of double-track open-deck Trestles 83-A, 1185 lin. ft., and 83-B, 2190 lin. ft., to ballast deck trestles with concrete fire walls, Davis, Cal., to Sacto, $227,000 (completed). Line changes to reduce curvature, Truckee, Cal., to Floriston, $284,000 (completed). Purchase of water rights and construction of 10.9 miles of 6-in. pipe line, Imlay, Nev., $179,000 (completed). Purchase of water rights and construction of 85,356 lin. ft. of pipe line, Montello, Nev. $200,000 (completed). Construction of 18,582 ft. of new line to reduce curvature, Mt. Shasta-Black Butte, Cal., $319,000 (85 per cent completed).

Additional engine terminal and shop facilities, and tracks, Klamath Falls, Ore., $779,000 (completed). Revision of line to reduce curvature and eliminate 645 lin. ft. of trestles, New Era, Ore., $110,000 (completed). New passenger station, platforms and driveways, Stockton, Cal., $555,200 (completed). Remodel Union station, Portland, Ore., (started). Construction of 30,000 lin. ft. of double track main line and 36,500 lin. ft. of sidings and yard tracks, two bridges and passenger station, San Jose, Cal., $3,279,000 (10 per cent completed). Construction of engine-minal and shop facilities, Taylor Yard, Taylor, Cal., $676,000 (completed). Construction of riprap bulkhead and filling low ground along Los Angeles river, Taylor yard, Taylor, $102,000 (40 per cent completed). Construction of double-track connection with Union Pacific, including concrete arch, Los Angeles, Cal., $433,000 (55 per cent completed). Raising A. T. & S. F. bridge over Los Angeles river to separate grades, Los Angeles, Cal., $121,000 (75 per cent completed).

Grade separation, Sixth avenue, Tucson, Ariz., $199,000 (completed). Revision of line, reconstruction of portals at Tunnels 4 and 5, enlarge Tunnels 6 and 7 and install riprap bank protection between Reuben, Ore., and Union Creek, $126,000 (completed). Reconstruct and extend l.c.l. freight facilities, Oakland, Cal., $334,000 (10 per cent completed). Conversion of double track Trestle 84-A, 3240 ft. long, from open deck to ballasted deck, between Davis, Cal., and Sacto, $186,000 (completed). Construction of a rock-filled dam 90 ft. high across Bonito Creek to provide 332,000,000 gal. water storage, Bonito Creek, N. M., $540,000 (75 per cent completed). Construction of five-story addition to general hospital, San Francisco, Cal., $511,000 (95 per cent completed). Extension to hospital buildings and alterations, Tucson, Ariz., $175,000 (95 per cent completed). Construction of double-track bridge, 5,541 ft. long across Suisun bay, between Martinez, Cal., and Benicia, $12,000,000 (completed). Rehabilitation of Wendel-Alturas line, 100 miles, and construct engine terminal facilities, additional sidings and yards, buildings and other facilities. $1,696,000 (completed).

(Texas and Lousiana lines) New road under construction, extension to Lockport branch, 4.95 miles, Lockport, La., $110,000 (15 per cent completed). Construction of trackage to serve industrial development, Houston. Tex., $106,000 (65 per cent completed). Replacing trestles and raising grade two feet, Barkwell, Tex., $144,600 (completed). Installation of water-treating plants at 19 water stations in Texas, $183,800 (completed). Replacing a 228-ft. draw span at Bridge 5-A with a new span, Houston, Tex., $112,300 (completed). Construction of additional yard tracks and automobile unloading platform, San Antonio, Tex., $114,700 (completed). Development of produce terminal and warehouse, New Orleans, La., $453,-600 (50 per cent completed).

Spokane, Portland & Seattle

First Track: Lebanon, Ore., to Sweet Home, 14 miles. Sweet Home, Ore., to Calapooya river, 13 miles.

Important Work Undertaken: Reconstruction of three high trestles (160 ft. high), Portland, Ore., to Keasey, $167,000 (completed). Construction of 27 miles of new road between Labanon, Ore., and Sweet Home $910,000 (in operation, 95 per cent completed).

(Lines Under Survey) Sweet Home, Ore., to Cascadia, 12 miles. Sweet Home to Whitcombs, 8 miles. Lebanon, Ore., to McDowell's Creek, 6 miles. Line up the Calapooya river, 9 miles.

Springfield Terminal Railway

Important Work Undertaken: Construction of three-span steel bridge, Charleston, N. H., $150,000 (completed).

Tennessee, Alabama & Georgia

Important Work Undertaken: Reconstruction and strengthening of all main-line bridges; widening embankments and cuts; general rehabilitation of roadbed, Chattanooga, Tenn., to Gadsen, Ala., 92 miles, $500,000 (70 per cent completed).

Terminal Railroad Association of St. Louis

Important Work Undertaken: Construction of concrete platforms and installation of granite block pavement in four tracks, Union station, St. Louis, Mo., $100,000 (completed). Construction of 8-story reinforced concrete warehouse and mart, with 13-story tower, between Twelfth and Thirteenth streets, and Spruce and Poplar streets, St. Louis, Mo., $3,000,000 (10 per cent completed).

Texas & Pacific

First Track: (Texas Short Line) Grand Saline, Tex., to Van, 11.68 miles. (Texas-New Mexico). Texas-New Mexico state line to Lovington, N. M., 73.48 miles.

Second Track: Browder, Tex., to Nussbaumer, 8.3 miles.

Important Work Undertaken: Construction of second track, Union Terminal Jct., Dallas, Tex., to Browder, 1.3 miles. Construction of engine terminal and shop facilities, Big Springs, Tex., $610,000 (completed). Grade separation, Benton street, Big Springs, $112,000 (completed). New double track steel bridge 2,100 ft. long over Trinity River floodway, Dallas, Tex., $700,000 (90 per cent completed). Replacing two piers and constructing an additional 300-ft. span over Old river, Torras, La., $325,000 (30 per cent completed). Grade separation, Good street, Dallas, Tex., $290,000 (completed).

Elimination of grade crossing, Tennessee street, Ft. Worth, Tex., $110,000 (completed). Elimination of grade crossing, Henderson street, Worth, $400,000 (75 per cent completed). Twelve-story passenger station and office building, Ft. Worth, $1,500,000 (25 per cent completed). Eight-story inbound freight house and storage warehouse, Ft. Worth, Tex., $1,800,000 (25 per cent completed). Water supply pipe line, 12-in., 10-in., in., and 8-in., C. I. pipe, 37 miles long for locomotive water supply, Toyahville, Tex., to Toyah, $500,000 (completed). Additional yard tracks, Bonham, Tex., $130,000 (completed).

Toledo, Angola & Western

Important Work Undertaken: Elimination of grade crossing, Monroe street, Toledo, Ohio, $240,000 (completed).

Toledo Terminal Railroad

Important Work Undertaken: Reconstruction of bridge over Maumee river, Toledo, Ohio, $1,300,000 (completed).

Trinity Valley & Northern

Important Work Projected: New line under survey Cleveland, Tex., to Havens, 12 miles.

Tulsa Union Depot

Important Work Undertaken: Construction of union station, additional passenger tracks, revision of grade and elimination of four grade crossings, Tulsa, Okla., $2,500,000, construction work by St. Louis-San Francisco (90 per cent completed).

Union Pacific System

Second Track: (Los Angeles & Salt Lake) Alhambra avenue to Avenue 18, Los Angeles, Cal., 0.5 mile.

Important Work Undertaken: Construction of new Union passenger station and incidental facilities, Omaha, Neb., $3,400,000 (90 per cent completed). Replacing 3-span bridge over Seventh street with a single span, Omaha, $147,200 (completed). Grade separation, Twenty-seventh street and Creighton avenue, Omaha, Neb., $163,600 (10 per cent completed). Grade separation at Thirty-third avenue to serve Lincoln and Meridian highways, and construct 10,187 ft. of siding, Columbus, Neb., $230,000 (40 per cent completed).

Addition to yard and additional yard facilities, grade separation and bridge for 17 tracks over Crow Creek, Cheyenne, Wyo., $1,886,000 (5 per cent completed). Improvement in the treating plant and additional treating equipment, Laramie, Wyo., $100,000 (90 per cent completed).

(St. Joseph & Grand Island) Construction of combination passenger and freight station, and driveways, and rearrangement of tracks, Fairbury, Neb., $100,000 (completed).

(Oregon Short Line) Construction of combination warehouse, mill and elevator and tracks and incidental facilities, Salt Lake City, Utah, $225,000 (75 per cent completed). Extension of power house and installation of one 668-hp. boiler with auxiliaries, Pocatello, Idaho, $165,000 (completed).

(Oregon-Washington Railroad & Navigation Company). Construction of two-story passenger station and office building and incidental facilities, La Grande, Ore., $128,000 (completed). Construction of 3,409 ft. new line, including one 550-ft. double-track tunnel, concrete lined, Chatfield, Ore., $185,700 (48 per cent completed).

(Los Angeles & Salt Lake) New road under construction. Boulder Junction, Nev., to Summit, 22.7 miles. Grade crossing elimination Ninth and Lemon streets, Los Angeles, Cal., $238,000 (5 per cent completed).

Construction of a reinforced concrete viaduct spanning the Los Angeles river and over the track of the A. T. & S. F. and L. A. & S. L. railways, Los Angeles, L. A. & S. L. proportion $520,000 (10 per cent completed). Reinforced concrete viaduct over Los Angeles river and the A. T. & S. F. and L. A. & S. L. tracks, Fourth street, Los Angeles, L. A. & S. L. proportion, $395,000 (60 per cent completed). Construction of additional unit, freight house at Hunter and Alameda streets, Los Angeles, $288,000, (completed). Grade crossing elimination, Spence street, San Pedro branch, Hobart, Cal., $142,000 (15 per cent completed). Replacing two-span bridge over Whittier boulevard with a single span 165 ft. long, Whittier, Cal., $100,000 (completed). Grade separation, State highway, Wineville, Cal., $165,000 (completed). Enlarging tunnel No. 4 to standard double-track section and line throughout, Kyle, Nev., $502,500 (5 per cent completed). Enlarge Tunnel 6 to standard double-track section and line throughout, Stine, Nev., $200,500 (completed).

Important Work Projected: Six-story warehouse, Ninth and Alameda streets, Los Angeles, Cal., $800,000.

Union Terminal Company

Important Work Undertaken: Grade crossing elimination, including rearrangement of tracks and facilities, Cadiz street, Dallas, Tex., U. T. proportion $150,000 (completed).

Utah Railway

Second Track: Utah Railway Junction, Utah, to Martin, 0.91 mile.

Virginian

First Track: From M. P. 19, Itman branch to Baileysville, W. Va., 7 miles.

Important Work Undertaken: New road under construction, Baileysville, W. Va., to Gilbert, 18.4 miles. New connection with Kanawaha & Michigan, 1.04 miles, Deepwater, W. Va. Replacing timber trestles with permanent structures, Long Island, Va., to Taber, $120,000 (completed).

Wabash

Important Work Undertaken: Replacing Bridge 747, Danville, Ill., $462,-200 (completed). Grade separation, Western avenue, Chicago, $352,700 (completed). Elimination of grade crossing, Brush College road, Decatur, Ill., $233,000 (completed). Reconstruction of Bridge 499, Brunswick, Mo., $141,600 (80 per cent completed). Separation of grades, Union and Lindell avenues, St. Louis, Mo., $299,000 (80 per cent completed). Construction of new bridge over Missouri river, St. Charles, Mo., $5,500,000 (5 per cent completed). Additional improvements, Wabash elevator, North Kansas City, Mo., $299,300 (completed).

Western Maryland

Important Work Undertaken: Construction of ore-handling facilities, Port Covington, Md., $472,000 (completed). Replacing various bridges with heavier structures, $115,000 (40 per cent completed).

Western Pacific

Important Work Undertaken: Construction of 111.86 miles of single-track main line and 22 miles of sidings, Keddie, Cal., to Bieber, to connect with Great Northern, $9,800,000 (0.5 per cent completed). Widening and strengthening roadbed, Portola, Cal., to Wendover, Utah, 247 miles, $400,-000 (80 per cent completed). Lengthening passing sidings at various points, $165,000 (completed). Rehabilitation of roadbed and track, Stockton, Cal., to Sacramento, $350,000 (completed).

Railway Construction in Canada

Canadian National

First Track: Lake Verde, P. E. I. to Pisquid, 10 miles. Sunny Brae, N. S., to Guysborough, 20 miles. Mawer, Sask., southwesterly, 50.2 miles. Hamlin, Sask., to Glenbush, 31.8 miles. Melfort, Sask., to Aberdeen, 3.6 miles. Neidpath, Sask., to Swift Current, 10 miles. Ridgedale, Sask., easterly, 0.86 mile. Hemaruka, Alta., to Scapa, 5 miles. In Lulu St. Walburg, Alta., to Bonnyville, 20.17 miles. Alliance, Alta., southeasterly, 0.86 miles. Hemaruka, Alta., to Scapa, 5 miles. On Lulu Island, B. C., 3.38 miles.

Important Work Undertaken: New passenger station, Halifax, N. S. (completed). Construction of new hotel, Halifax (completed). Renewing superstructure, ferry ships, Point Tupper and Mulgrave, N. S., to carry Coopers E-60 loading (completed). Construction of new hotel at Charlottetown, P. E. I. (to be completed in 1931). Reconstruction of Murray Harbor and Vernon subdivisions to standard gage, P. E. I. (completed). Construction of foundry, oil storage, garage and firing up and inspection shop, new locomotive shops, Montreal, Que. (completed). Construction of new passenger station, Hamilton, Ont. (to be completed in 1931). Construction of 3.31 miles of spur track to new elevator, Kingston, Ontario (completed). Extension to Chateau Laurier, Ottawa, Ont. (completed). Construction of new fruit facilities, temporary express facilities, new local freight house and extension of passenger tracks and platforms, St. Bonaventure station area, Montreal, Que. (to be completed in 1931). Construction of a spur track, St. Eustace, Que., to Oka (to be completed in 1931). Construction of a new storage yard, Montreal East, Que. (completed). Construction of 400 ton mechanical cooling plant, icing facilities and additional yard tracks, Mimico, Ont. (completed).

Alterations and extension to pier, Vancouver, B. C. (to be completed in 1931). Construction of a new storage yard, Montreal East, Que. service (completed). Filling False Creek for future terminal facilities (completion indefinite). Replacing Bridge 87.1, Regina division, Sask., with permanent structure (completed). Reconstruction of Bridge 78.8, Kamloops division, B. C. (completed). Elimination of grade crossing Pembina highway, Winnipeg, Man. (to be completed in 1931). Extension to storage warehouse, Winnipeg (completed). Elimination of grade crossing, Ninety-seventh street, Edmonton, Alta. (completed). Construction of new 595-room hotel, Vancouver, B. C. (to be completed in 1932). Additional staff buildings, additional equipment and continuation of landscaping, Jasper Park Lodge, Jasper Park, Alta. (completion indefinitie).

Construction of a new freight line cutoff, Regina, Sask. (to be completed in 1931). Construction of a new 260-room hotel, Saskatoon, Sask. (to be completed in 1931). Replacing Bridge 80.6 with a permanent structure and revising alinement, Albreda subdivision (completed). Alterations and improvement to dock, Inner Harbor terminal, Victoria, B. C. (completed). Construction of 6-story warehouse, Montreal, Que. (completed).

Reconstruction of Bridge 87.9 over Becancour river, Sorel subdivision, P. Q. (to be completed in 1931). Construction of new freight shed, Mission, Man. (to be completed in 1931). Construction of reinforced concrete subway and revision of alinement to eliminate grade crossing, St. Clair avenue, Toronto, Ont. (to be completed in 1931). Construction of new terminals, Montreal, Que. (completion indefinite). Track elevation between Bathurst street and Logan avenue, Toronto, Ont., joint with Canadian Pacific (to be completed in 1931). Grade crossing elimination, La Canardiere, road Limoilu, Que. (to be completed in 1931).

Elimination of grade crossing, West street, Brantford, Ont. (to be completed in 1931). Elimination of grade crossing, Simcoe street, Oshawa, Ont. (to be completed in 1931). Elimination of grade crossings and construction of new station, London, Ont. (started). Austin-Amherst grade crossing elimination, Black Rock, Buffalo, N. Y., joint with other railways (completion indefinite). Construction of spur track to serve elevator, Sorel, Que. (to be completed in 1931). Construction of new passenger station, Saskatoon, Sask. (completion indefinite). Construction of line from St. Walburg, Sask., to Bonnyville (grading completed 4 miles). Construction of line, Bulwark, Alta., easterly (18 miles of grading completed).

Canadian Pacific

First Track: Archive, Sask., to Wymark, 38.9 miles (completed). Asquith, Sask., to Cloan, 14.3 miles (grading completed and track laid). Dunelm, Sask., southwesterly, 25 miles (grading completed). Fife Lake, Sask., westerly 25 miles (grading completed and 3 miles of track laid). Hamlin, Sask., to Shellbrook, 25 miles (started). Medstead, Sask., northeasterly, 35 miles (started). Rosetown, Sask., southeasterly, 18 miles, (started). Tuffnell, Sask., to Prince Albert, 70.8 miles (grading 37 per cent completed, 50.3 miles of track laid).

Crossfield, Alta., northwesterly, 27.9 miles, (grading completed and track laid). Prince Albert, Alta., to Lac la Biche, 94 miles (grading 85 per cent completed). Suffield, Alta., to Blackie 22.34 miles (completed). Coronation, Alta., to Youngstown, 39.6 (track laid). Bulwark, Alta., to Berkinshaw, 14.5 miles (grading completed and track laid). Vanguard, Alta., to Meyronne, 30 miles (grading 56 per cent completed). Wolfe's Cove branch, P. Q., 1.5 miles (grading completed, 0.5 mile of track laid). Kootenay Landing, B. C., to Proctor, 34.6 miles (grading completed and track laid).

(Lacombe & Northwestern), Alta., 20.3 miles (grading completed and track laid).

Second Track: Sudbury, Ont., to Azelda, 7.10 miles.

Important Work Undertaken: Construction of Lakeside Inn, 55-room hotel and 5 cottages, Yarmouth, N. S., $415,000 (10 per cent completed). Construction of New Cornwallis Inn, 100 rooms, Kentville, N. S., $700,000 (completed). Construction of quarters for help, New Pines hotel, Digby, N. S., $135,000 (50 per cent completed). Construction of club house for Canadian Pacific Amateur Athletic Association, Montreal, Que., $120,000 (50 per cent completed). Replacing terra cotta facing with Indiana limestone, office building, Toronto, Ont., $370,000 (completed). Terminal improvements, Toronto, Ont., $3,000,000 (60 per cent completed). Alterations and additions to Royal Alexandra hotel, Winnipeg, Man., $100,000 (completed). Construction of garage and stables, Chateau Lake Louise, Lake Louise, B. C., $118,000 (completed). Extension to Royal York hotel, 170 rooms, Toronto, Ont., $1,190,000 (completed). Extension of terminal facilities, Quebec, P. Q., $1,300,000 (20 per cent completed).

Northern Alberta Railways

First Track: Grande Prairie Branch, M. P. 88.8 to M. P. 138.8, Alberta, 50 miles. Peace River branch, M. P. 98.2 to M. P. 113.8, Alberta, 15.6 miles.

Pacific Great Eastern

Important Work Undertaken: Revision of alinement through Lillooet, B. C., 5 miles, including a bridge over the Fraser river and the construction of terminal facilities, $600,000 (17 per cent completed).

Roberville & Saguenay

First Track: Arvida, P. Q., to Kenogami, 2.95 miles, $200,000.

Temiskaming & Northern Ontario

First Track: Coral Rapids, Ont., to Moose river, 45 miles.

Important Work Undertaken: New road under construction, Moose river, Ont., to Moose Factory, 45 miles.

Toronto, Hamilton & Buffalo

Important Work Undertaken: Construction of new engine terminal, Hamilton, Ont., $1,200,000 (completed). Replacing bridge over Chippewa river with double-track bridge, Welland, Ont., $128,000 (75 per cent completed). Revision of alinement and elevation of tracks for flood prevention, Dundas branch, Hamilton, Ont. (completed).

Railway Construction in Mexico

Mexican Pacific

First Track: Kilometer 7 to end of line, Sinaloa, Sin., 3.75 miles.

National Railways of Mexico

First Track: Mexico-Tampico Short Line, 8 miles. Gulf Coast Line, Tampico to Vera Cruz, 8 miles. Line Calles to Guerrero, 46.7 miles.

Important Work Undertaken: Mexico-Tampico Short Line, 333.7 miles (22.9 per cent completed, 48 miles in operation). Gulf Coast Line, Tampico to Vera Cruz, 312.8 miles (16.7 per cent completed, 48 miles in operation). Line Calles to Guerrero, 78.7 miles (95 per cent completed, 78.7 miles in operation). Construction of locomotive and car repair shops, Monterey, N. L. (80 per cent completed).

Important Work Projected: New lines authorized: Empalme de el Oro to Sierra Moiada. San Carlos to Villa Acuña. El Salto to Mazatlan (Durango to Mazatlan extension).

(New Lines Under Survey). Soledad to Puerto de Tuxpan (surveys completed). Aristeo to Apatzingan (surveys completed).

(New Lines Projected). Sierra Mojada to Jimenez. Zacaticas and Berriozabal to La Honda. Rosario to Inde. Inde to Descubridora. Indes to Tepehuanes. Tepehuanes to Guanacevi. Puerto Mexico and Sta. Lucrecia to Campeche. Balsas to Acapulco. Tehuacan and Tezonapa to Rio Blanco. Coapa to Coyuca. Balsas to Zihuatanejo. Ejutla to Puerto Angel, 75 miles. Tlacolula to Tehuantepec.

Southern Pacific

Important Work Undertaken: Replacing pile trestle approaches with permanent construction, bridge over Santiago river, Ocotlan, Jal., $515,400 (completed).

* * * *

A 65-ft. Gondola Car Built for the Delaware, Lackawanna & Western by the Magor Car Corporation

Market Losses; Few Stock Issues Mark

RAILWAY FINANCES IN 1930

By J. G. Lyne
Financial Editor
Railway Age

Gloom has dominated for most of the year, but many favorable potentialities lie ahead—Most dividends maintained

THAT the year just past has been one of tumbling prices no one needs to be told. An examination of the extent of the decline, however, and its momentary upward and downward vagaries is, nevertheless, instructive as charting the course of an economic phenomenon of painful importance to all of us.

The *Railway Age* index of the average price of twenty leading railroad stocks on December 16 stood at 76.63 (although this was followed by a sharp recovery on the following day), as compared with 127.39 at the beginning of the year, a decline of 39 per cent. From the high point, 164, attained by this index in September, 1929, the decline to December 16 last was 47 per cent.

With bond prices, naturally, the picture is somewhat less spectacular. The average price of twenty leading railway bonds on December 16 was 89.44, as compared with 92.81 at the beginning of the year and 89.15 when the stock market boom was at its height in October, 1929. In spite, however, of the fact that the bond market has held its own much better than that of stocks, its movement has been keenly disappointing. In the summer it began a steady upward trend which was maintained until the last week in September when the index reached the high point of 96.18. Since a rising bond market usually precedes rising stock prices, this trend was taken as a favorable indication for the early future of business. However, with the outbreak of revolutionary disturbances in several countries, foreign bonds took a downward course and domestic issues fell in sympathy. The improving market of the late summer and early fall did, however, give a fillip to financing and heavy sales of new issues of bonds and equipment trust certificates occurred during that period.

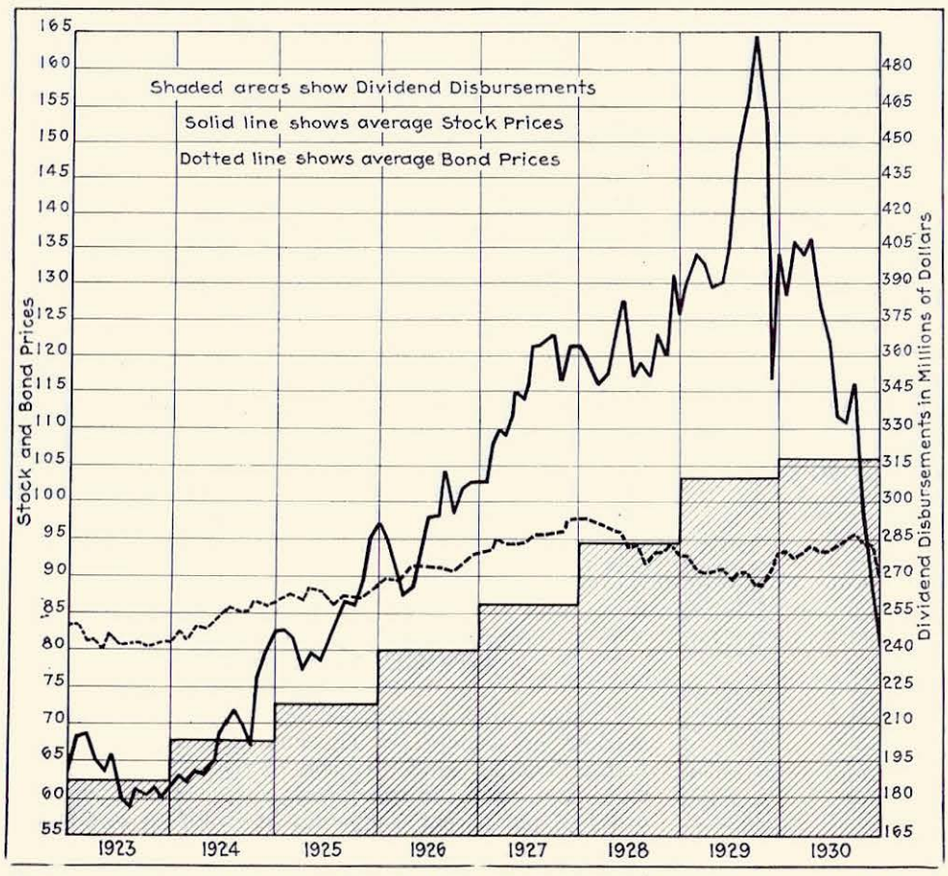


Chart A—Average Prices of Stocks and Bonds of Twenty Leading Railroads, with Dividend Disbursement Charges Shown on the Same Relative Scale

1930 Dividend Payments estimated

The Wall Street Journal publishes regularly average prices of representative stocks, not only of railroads but of industrials and utilities as well. Its average of representative railroad stocks is on a somewhat higher scale than that of the *Railway Age*, having started the year at 145, whereas that of the *Railway Age* at the same time stood at 127. The Wall Street Journal's index on December 15 had declined to 93.6, or 35 per cent. Meantime its index of industrial stocks declined from 248 at the beginning of the year to 163 on December 15, or 34 per cent; and utility stocks from 88 to 57, or 35 per cent. The railways have thus, apparently, held their own fairly well from a comparative standpoint.

On the other hand, as was pointed out in the Annual Review Number a year ago, railway stocks never soared

so high in the market boom as did the industrials. Railroad stock prices, according to the Wall Street Journal's averages, in 1929 ranged from a high point of 189 to a low of 128. Industrial stocks, on the other hand, reached a peak of 381 in 1929 and a low of 199. Comfort could be taken at the end of 1929 that railroad shares, while they had not skyrocketed with the industrials, at least were no lower in price at the end of that year than at the beginning; whereas industrial stocks were about 12 per cent less. This year the picture is not so pleasant, since the market's appraisal of the railways has shown practically the same shading as that of the industrials.

An enterprise might not be embarrassed by a failure of its shares to bound upward in boom times if it could be assured that they would not decline with the rest in times of economic quiescence. That they should not soar when others soar, but must sag with them is

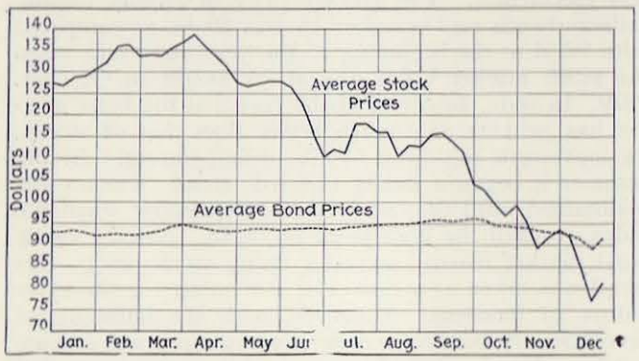


Chart B—Fluctuations in Average Price of Twenty Leading Railway Stocks and Twenty Leading Railway Bonds in 1930

one of the indications that the present railroad situation is *not* due solely to the depression—the allegation that it is so to be accounted for being made by those who would deny the railways' plea that they be placed upon a basis of economic equality of opportunity with their competitors. That the railways have done as well as they have, their handicaps being what they are as compared with the freedom from regulation and taxation and virtual subsidy enjoyed by their competitors, affords conclusive evidence of their conservative financial structure and their high standard of efficiency.

Chart A shows the *Railway Age* average of stock and bond prices of 20 leading railroads during the past eight years, with dividend disbursements of these same railroads plotted on the same relative scale. It will be seen that, whereas from 1925 onward stock prices outstripped dividends in their rate of increase, during 1930 the situation was largely corrected. Dividend payments were maintained—even slightly increased—whereas stock market prices dropped down into the area showing the total of dividend disbursements.

This is a natural development, since dividends in the case of many roads were in 1930 paid out of surplus, which cannot be continued indefinitely unless there is a revival in earnings. Such a revival could come from an upturn in general business or definite progress in placing the railroads on a more equitable competitive basis with other forms of transport. Unless the railways are unfortunate indeed, both these favorable developments ought to come in 1931. The former—a revival in general business—hinges on factors beyond the control of any one group. The latter—progress in placing the railways on a better competitive footing—lies squarely at the door of our industrial and political leaders. Along with their responsibility goes also the effort being made by the railways to compose differences among themselves which may be harmful to the industry and to organize intelligently to secure vigorous public support. The observer of tendencies in the stock market during the coming year will probably find developments in this latter sphere to have quite as much bearing on future market trends of railway securities as the ups and downs of general business.

Another factor which may have a considerable bearing on future stock prices is increased activity on the part of railway security owners to learn and disseminate the facts about the railroad situation and exert intelligent effort toward correcting whatever evils they may find. Of such activity may be mentioned that of the National Association of Owners of Railway and Public Utilities Securities in arranging for the discussion of railway problems in various population centers. Another is the vigorous and intelligent railroad protagonism recently manifest by one of the investment trusts which specializes in railway securities. If other investment trusts and large holders of railway securities generally should follow these admirable examples the results could not be otherwise than extremely helpful. Such developments are of great potential significance; they should be followed closely by those who would be *au courant* with the railroads' financial future. Again, the Interstate Commerce Commission and other regulatory and legislative bodies will be watched with interest for any signs of a more liberal attitude toward the railways—any development of which would certainly be reflected in more favorable market trends. Professor William Z. Ripley in an address in New York on December 18 called attention to the fact that the railways have in the past gone through crises quite as severe as this one; and that it is precisely such a crisis which is needed to draw the attention of the public to the problem, gaining their support for efforts made to solve it.

Table I—Comparison of Dividends and Taxes, 1911 to 1929

Year Ended June 30	Dividends*	Proportion of net Income Paid in Dividends	Taxes*
1911	$397,068,724	81	$98,626,848
1912	339,964,855	85	109,445,407
1913	322,300,406	66	118,386,859
1914	376,098,785	108	135,572,579
1915	259,809,520	82	133,276,330
1916	281,936,371	47	145,517,034
Year Ended December 31			
1916	306,176,937	47	157,113,372
1917	320,395,779	53	213,920,095
1918	275,336,547	71	223,175,379
1919	278,516,908	62.5	232,601,397
1920	271,731,669	63	272,061,453
1921	298,511,328	95	275,875,990
1922	271,573,751	73	301,034,923
1923	296,127,048	53	331,915,459
1924	320,429,767	57	340,336,686
1925	342,020,885	49	358,516,046
1926	399,243,963	49	388,922,856
1927	411,581,093	61	376,110,250
1928	430,677,138	55	389,432,415
1929	490,125,673	55	396,682,634

* Not including switching and terminal companies.

Dividend Changes

Changes in dividends during the year were not as marked as changes in earnings and market prices. Extra dividends and dividend increases were, for the most part, those of subsidiary companies, declared in order to put parent companies in funds to meet their requirements. The most notable of these were the extra dividends declared out of surplus by a number of companies in which the Southern has large holdings, placing the latter company in position after adding its

own earnings not only to meet its 1930 dividend requirements but also a part of those of 1931. The Burlington declared an extra dividend of 5 per cent, adding to the income of the Great Northern and Northern Pacific. The Ann Arbor by an initial payment of $6 on common and $5 on preferred and an extra of $27 on common made a substantial contribution to the treasury of the Wabash.

The Missouri-Kansas-Texas established a 4 per cent dividend basis on its common stock as did the Boston & Maine. The Norfolk & Western changed from an 8 per cent per annum basis to 10. Its usual extra dividend was $2, however, instead of $4 as in 1929, so the basis of return to shareholders was unchanged. The Wheeling & Lake Erie made great progress in clearing up arrearages in dividends on its 7 per cent prior lien stock, back payments covering the period from November, 1929, to August, 1924, having been made.

The Chicago & North Western changed from a 6 per cent basis to 4 per cent (in 1929 payments aggregated 5 per cent) on its common stock. The Buffalo, Rochester & Pittsburgh on July 31 voted to omit its common dividend. The Lehigh Valley, while maintaining its regular dividends, omitted the extra of $1 usually declared in December. The Delaware, Lackawanna & Western likewise omitted its usual extra.

These and other changes are noted in greater detail in the following partial list of dividend fluctuations:

Alabama Great Southern.—This company declared a special dividend of 12 per cent and an extra dividend of 3 per cent a share on its preferred and common stock, in addition to the customary semi-annual dividends on each of the stocks.

Ann Arbor.—The directors of this company in June declared an initial annual dividend of $6 a share on common stock and $5 a share on the 5 per cent non-cumulative preferred stock. In December another dividend of $27 on the common stock was declared out of surplus.

Augusta & Savannah.—An extra dividend of ¼ of 1 per cent was declared by the directors of this company in June.

Boston & Maine.—The directors of this company declared a $1 dividend on the common stock in March, placing it on a 4 per cent per annum basis. This was the first distribution on the issues since 1913.

Buffalo, Rochester & Pittsburgh.—On July 31 the directors of this company voted to omit the semi-annual dividend of $2 a share on the common stock.

Central of New Jersey.—The directors of this company in January and June declared an extra dividend of 2 per cent.

Chesapeake & Ohio.—In August the directors declared an initial dividend of 62½ cents per share on the new $25 par common stock, placing it on a $2.50 annual basis, which is equivalent to the $10 annual rate formerly paid on the $100 par common stock before the 4 to 1 split-up.

Chicago & North Western.—In February the directors of this company placed the common and preferred stock of this company on a quarterly dividend basis, 1¼ per cent on the common and 1¾ per cent on the preferred, previously the company paid semi-annual dividends of 2½ per cent on the common and 3½ per cent on the preferred. In November the rate was changed to $.25 a share placing the stock on a $4 annual basis.

Chicago, Burlington & Quincy.—On December 4 the directors of this company declared an extra dividend of 5 per cent on outstanding capital stock. This was the first extra dividend declared since 1921.

Chicago, Indianapolis & Louisville.—An extra semi-annual dividend of 1 per cent on the common stock was declared by the directors of this company on June 11.

Cincinnati, New Orleans & Texas Pacific.—The directors of this company on November 18 declared an extra dividend of 50 per cent on the common stock.

Cleveland, Cincinnati, Chicago & St. Louis.—This company in April declared a semi-annual dividend of $5 a share on common stock, placing the issue on a $10 annual basis instead of $8 as previously paid.

Georgia, Southern & Florida.—In November the directors of this company voted to omit the semi-annual dividend of $2.50 per share due on the participating and non-cumulative 2nd preferred stock.

Hocking Valley.—The directors of this company in April declared a special dividend of 6¼ per cent on the capital stock, payable May 10.

Kansas, Oklahoma & Gulf.—The directors of this company in May declared an initial semi-annual dividend of 3 per cent on the series B 6 per cent non-cumulative preferred stock.

Lehigh & Hudson River.—This company on December 31, 1929, paid an extra dividend of 4 per cent on capital stock.

Maine Central.—On February 28 the directors of this company declared a quarterly dividend of $1.25 a share on common stock, placing the issue on a $5 annual basis compared with the $4 rate previously paid.

Maryland & Pennsylvania.—The directors of this company in April declared an initial dividend of $4 a share and in October a $2 dividend was also declared.

Michigan Central.—The directors of this company on June 19 declared a semi-annual dividend of 25 per cent on outstanding capital stock. Previously the company paid semi-annual dividends of 20 per cent and, in addition, in March, 1929, paid a cash dividend of 100 per cent.

Missouri-Kansas-Texas.—This company in May declared an initial $1 dividend on its common stock, placing it on a $4 annual basis. This was the first dividend to be declared by this company since its reorganization in 1922.

Nashville, Chattanooga & St. Louis.—An extra dividend of 1 per cent was paid by the directors of this company in February and in July a semi-annual dividend of 2½ per cent was declared. This is equivalent to an $8 annual rate on stock outstanding prior to the 60 per cent stock distribution made on February 15 1930, and compares with a dividend rate of $7 previously paid.

Norfolk & Western.—The directors of this company declared a quarterly dividend of $2.50 on common stock, raising the rate from $8 per share per annum to $10. In October an extra dividend of 2 per cent on this stock was also declared.

Peterborough R. R.—This company on April 1 paid a semi-annual dividend of 1¾ per cent on the capital stock. Previously the company paid semi-annual dividends of 2 per cent each.

Richmond-Washington.—This company in April paid an extra dividend of 4½ per cent on its capital stock.

Rutland.—A dividend of 2 per cent on preferred stock was declared by this company in April and September. A similar dividend was paid in October, 1929, the last previous payment being a 1 per cent dividend in December, 1928.

St. Louis-Southwestern.—The directors of this company on November 21 voted to omit the regular quarterly dividend of $1.25 a share on the 5 per cent preferred stock.

Wabash.—The directors of this company declared a dividend of $10 a share on Class B preferred stock on account of arrearages; this dividend covered the years 1928 and 1929.

Western New York & Pennsylvania.—A 4 per cent dividend on the common stock ($50 par) of this company was declared by the directors in January, also a 5 per cent dividend on the 5 per cent non-cumulative preferred ($50 par). These were the first dividends to be declared since recapitalization.

West Jersey & Seashore.—The directors of this company in March, declared a semi-annual dividend of 3 per cent. For the periods between October 15, 1927, and October 15, 1929, semi-annual dividends of 2½ per cent were paid.

Wheeling & Lake Erie.—In February the directors of this company declared a dividend of 5¼ per cent on the 7 per cent prior lien stock of this company covering the period from November 1, 1921, to August 1, 1922; in June a 7 per cent dividend was declared to cover the period from August 1, 1922, to August 1, 1923, and on October 8 a further dividend of 7 per cent was declared covering the period from August 1, 1923, to August 1, 1924.

Table II—Partial List of Securities Issued in 1930—Stock

Road	Amount	Terms
Boston & Maine	$7,500,000	Prior Preference Stock offered in exchange on equal terms for mortgage bonds.
Chesapeake & Ohio	18,152,400	Common Stock offered for sale pro rata to stockholders, at par, at rate of one new share for each share held.
Chesapeake & Ohio	191,528,367	Common stock of par value of $25 offered in exchange for equal amount of existing $100 par common stock and 6½ per cent cumulative convertible preferred stock, series A, at rate of four shares of new for one share of old stock.
Grand Trunk Western	4,663,607	$25 par value common stock amounting to $6,184,002 and $2,651,546 of 6 per cent cumulative of $100 par value, delivered to Canadian National in satisfaction of indebtedness.
New York Central	7,500,000	Capital stock offered at $130 a share to officers and employees who have been in service of the company for two or more years.
Pennsylvania	18,000,000	Capital stock of $50 par value offered to officers and employees of the company who have been in service of the company for at least 6 months.
Canadian Pacific	330,000,000	Common stock of $25 par value exchanged 4 shares for one for $100 par stock.
Chesapeake & Ohio	20,142,200	Offered for sale pro rata to common stockholders at $100 par at rate of one new share for each share held.

Bonds

Road	Maturity	Amount	Rate Int.	Sold to Banker Price	Sold to Banker % Cost	Offered to Public Price	Offered to Public Yield	Offered by
Akron, Canton & Youngstown, Mtge., Series B	1945	$1,500,000	5½	96.375	5.87	99.75	5.5	Otis & Co., Guardian Trust Co. (Cleveland) Coffin & Burr, Inc.
Algers, Winslow & Western, 1st Mtge.	1940	250,000	6	95.	7.166	....	.	Guardian Trust Co.
Aroostook Valley, 1st and Ref. Mtge., Series A	1954	1,000,000	5½	94	5.97	....	..	
Baltimore & Ohio Conv. Gold Bonds	1960	63,031,000	4½	95	4.984	95	..	Offered to common and preferred stockholders of record, Feb. 3, 1930, to extent of 20 per cent of holdings. Issue underwriten at fee of 2½ by Kuhn, Loeb & Co., Speyer & Co. and Natl. City Co.
Boston Terminal, 1st Mtge.	1950	1,163,000	4	99.09	4.07	100	..	Lee Higginson & Co., First Natl.-Old Colony Corp. (Boston).
Boston & Albany, Guar. Imp. Mtge., 1928	1973	5,700,000	4¼	....	...	93	4.6	J. P. Morgan & Co., First Natl. Bank and National City Co.
Boston & Maine, 1st Mtge.	1955	15,000,000	5	98	...	100.50	4.96	Kidder Peabody & Co., Lee Higginson & Co., Harris Forbes & Co., First Natl.-Old Colony Corp.
Canadian National, Guaranteed	1970	18,000,000	5	....	...	99.50	..	Offered by syndicate headed by Dillon Read & Co., and nine other American and Canadian bankers.
Canadian National, 25 yr. Gold	1955	50,000,000	4¾	....	...	99	..	Sold to syndicate headed by Chase Securities Corp.
Canadian Pacific, Coll. Trust Gold	1960	25,000,000	4½	...	...	98	4.62	National City Co., and six other American and Canadian bankers.
Chesapeake & Ohio, Ref. and Imp. Mtge., Series B	1995	35,088,000	4½	91.5	4.938	94	4.80	J. P. Morgan & Co., Kuhn, Loeb & Co., First Natl. Bank, Natl. City Co., Guaranty Co. of N. Y.
Chicago & North Western, Gen. Mtge. Gold	1987	5,031,000	4¾	....	...	103	4.60	Kuhn, Loeb & Co., and National City Co.
Chicago & North Western, 1st and Ref. Mtge., Series C	2037	12,000,000	4½	97.5	4.62	...	..	Kuhn, Loeb & Co.
Chicago, Indianapolis & Louisville, 1st and Gen. Mtge., Series A	1966	1,000,000	5	101.75	4.9	102.75	..	Potter & Co., and Harris, Forbes & Co.
Chicago, Milwaukee, St. Paul & Pac., Gen. Mtge., Series F	1989	15,000,000	4¾	98	4.85	100.50	..	Kuhn, Loeb & Co., and Natl. City Co.
Chicago, Rock Island & Pacific, Conv.	1960	32,228,000	4½	95	4.98	95	..	Offered to stockholders to extent of 25 per cent of holdings Issue underwritten by Speyer & Co., Natl. City Co. and J. W. Seligman at fee of 2½ per cent.
Cincinnati Union Term., Guar. 1st Mtge., Series A	2020	12,000,000	4½	....	...	102.25	4.39	J. P. Morgan & Co., First Natl. Bank, Kuhn, Loeb & Co., and National City Co.
Cleveland & Pittsburgh, Gen. and Ref. Mtge.	1977	7,182,000	4½	....	...	100.50	..	Kuhn, Loeb & Co.
Cleveland, Cinn. Chic. & St. Louis, Ref. and Imp., Series E	1977	24,000,000	4½	....	...	98	4.60	J. P. Morgan & Co., First National Bank, Guaranty Co. of N. Y.
Cleveland Union Term., Guar. 1st Mtge., Series C	1977	18,000,000	4½	....	..	98	4.60	J. P. Morgan & Co., First National Bank, National City Co.
Colorado & Southern, Gen. Mtge., Series A	1980	20,000,000	4½	93	4.875	95.25	4.75	J. P. Morgan & Co., First National Bank, National City Co.
Delaware, Lackawanna & Western, Guar. Cons. Mtge., Series A (Morris & Essex)	1955	10,000,000	5	101.25	4.914	103.5	4.76	J. P. Morgan & Co.
Delaware, Lackawanna & Western, Cons. Mtge., Series B. (Morris & Essex)	1955	15,000,000	4½	94.25	4.895	96.5	4.73	J. P. Morgan & Co.
Delaware & Hudson Corp., 1st and Ref. Mtge., Gold	1943	10,000,000	4	90.5	5.002	93	4.73	Kuhn, Loeb & Co. and 1st Natl. Bank
Erie, Ref. and Imp. Mtge., Series A	1975	50,000,00	5	93.5	5.385	95.5	5.25	J. P. Morgan & Co., First National Bank and National City Co.
Great Northern, Gen. Mtge., Series E	1977	10,000,000	4½	95	....	97	4.65	J. P. Morgan & Co., First National Bank and National City Co.
Gulf, Mobile & Northern, 1st Mtge., Series C	1950	3,000,000	5	97	5.24	99.5		Kuhn, Loeb & Co.
Louisiana & Arkansas, 1st Mtge., Series A	1969	13,000,000	5	....	...	92	5.50	Dillon Read & Co. and nine other bankers.
Louisville & Nashville, 1st and Ref. Mtge., Series C	2003	15,000,000	4½	92.5	4.875	95	4.74	J. P. Morgan & Co.
Louisville & Nashville, Unified	1940	5,000,000	4	92.5	4.96	94.5	4.65	J. P. Morgan & Co.
Michigan Central, Ref. & Imp. Mtge., Series C	1979	7,634,000	4½	....	...	98.5	4.55	J. P. Morgan & Co., First National Bank and National City Co.
Minneapolis, St. Paul & Sault Ste. Marie, 1st Ref. Mtge., Series B	1978	4,106,000	5½	96.5	5.71	99	..	Dillon Read & Co., National City Co., Lane Piper & Jaffray, Inc., First Securities Corp., and Bane-Northwest Co.
Missouri Pacific, 1st and Ref. Mtge., Series H	1980	25,000,000	5	97.75	5.125	100.25	..	Kuhn, Loeb & Co.
N. Y., Chicago & St. Louis, Ref. Mtge., Series C	1978	36,000,000	4½	95.25	4.752	97.75	4.6	Guaranty Co. of N. Y., Harris Forbes & Co., Dillon Read & Co., Lee Higginson & Co.
N. Y., Chicago & St. Louis, Ref. Mtge., Series C	1978	12,000,000	4½	95	4.765	97.50	4.63	Guaranty Co. of N. Y., Lee Higginson & Co., Harris Forbes & Co., Dillon Read & Co.
New York, New Haven & Hartford, 1st Mtge., Series C	1950	1,250,000	4½	99.214	4.56	99.88	4.51	Paine, Weber & Co. (Boston).

Road	Maturity	Amount	Rate Int.	Sold to Bankers Price	% Cost	Offered to Public Price	Yield %	Offered by
Pennsylvania, Gold Deb.	1970	60,000,000	4¼	92	4.926	94.50	4.81	Kuhn, Loeb & Co.
Pere Marquette, 1st Mtge., Series C	1980	14,000,000	4½	94.50	4.791	97	4.65	J. P. Morgan & Co., First National Bank, National City Co., J. W. Seligman & Co., Chase Securities.
Pittsburgh, Cincinnati, Chicago & St. Louis	1977	23,735,000	4½	...	....	100.50	...	Kuhn, Loeb & Co.
Pittsburgh & W. Va., 1st Mtge., Series C..	1960	6,000,000	4½	...	...	94.50	4.85	Brown Bros. & Co., Stone and Webster and Blodgett, Inc., Chase Securities Corp.
Pittsburgh & W. Va., 1st Mtge., Series D ..	1960	5,000,000	4½	94	4.88	....	..	.....
Reading, Gen. and Ref. Mtge., Series B	1997	15,000,000	4½	97.50	4.62	99.50	..	First National Bank of N. Y
St. Louis-San Francisco, Cons. Mtge., Series A	1978	10,000,000	4½	90.25	5.043	92.75	4.90	Speyer & Co., J. W. Seligman & Co., Guaranty Co. of N. Y.
Southern, 1st Cons. Mtge.	1994	3,106,000	5	108	4.61	109.50	4.54	J. P. Morgan & Co.
Southern Pacific, 1st Mtge., Series A	1977	41,294,000	4½	95	4.7677	97.50	4.63	Kuhn, Loeb & Co.
Terminal R. R. Ass'n of St. Louis, Gen. Mtge. Ref.	1953	3,500,000	4	89	4.81	91	4.65	J. P. Morgan & Co., First National Bank, National City Co.
Toledo Terminal, 1st Mtge.	1957	250,000	4½	...	...	98.50	4.60	Halsey Stuart & Co.
Virginian, 1st Mtge., Series B	1962	5,000,000	4½	94.25	4.84	97	4.68	National City Co., Lee Higgin & Co.
Wabash, Ref. and Gen. Mtge., Series D ...	1980	15,000,000	5	98	5.11	100.5	..	Kuhn, Loeb & Co.
Western Pacific, 1st Mtge.	1946	5,000,000	5	97.50	5.24	...		.....
Wheeling & Lake Erie, Ref. Mtge., Series B	1966	409,000	5	98.689	5.08	....	..	Stone and Webster and Blodgett, Inc.

Equipment Trust Certificates

Issue	Maturity	Amt.	Int.	Sold to Bankers Price	Cost %	Sold to Public Yield %	Offered by
Cent. R. R. of N. Jersey, Series 1926....	1941	$1,166,000	4½	101.329	4.2388	3.25-4.2	International Manhattan Co., Pressprich & Co.
Cent. R. R. of N. Jersey, Series 1926.....	1941	480,000	4½	99.192	4.65	.....	Mellon Nat'l Bk., Kauntze Bros.
Chesapeake & Ohio, Series 1930.....	1945	19,800,000	4½	99.137	4.636	4-4.55	Bankers Co. of N. Y., Continental Illinois Co., Evans Stillman & Co.
Chic. & North West. Series 1929.....	1945	1,425,000	4½	99.68	4.55	3¾-4½	First Nat'l. Bank of N. Y., Salomon Bros. & Hutzler.
Chicago Great Western, Series A.....	1945	2,235,000	4½	98.03	4.814	3.75-4.70	Salomon Bros. & Hutzler. Evans Stillman & Co.
Chic. St. Paul, Minn. & Omaha, Series H..	1944	390,000	4¾	100.277	4.70	3½-4.60	Harris Trust & Savings Bk., First Union Trust & Savings Bk., First Detroit Co.
Chic. Mil., St. Paul & Pacific, Series L.....	1945	4,260,000	4½	97.32	4.9295	4.5-4.85	International Manhattan Co., Inc., Salomon Bros. & Hutzler.
Chi. Mil., St. Paul & Pacific, Series K.....	1944	2,115,000	4½	97.66	4.874	4.80	Halsey Stuart & Co., Inc.
Chic. Rock Island & Pacific, Series Q.....	1945	14,040,000	4½	98.85	4.6874	3.5-4.6	First Nat'l. Bank, Salomon Bros. & Hutzler.
Erie, Series 1930.....	1945	6,690,000	4½	98.8401	4.6891	3.50-4.625	Drexel & Co.
Lehigh & New England, Series G.....	1945	800,000	4½	.....	4.508	3.75-4.35	Drexel & Co.
Long Island, Series J.....	1945	1,365,000	4½	99.95	4.508	3¼-4½	Salomon Bros. & Hutzler, First National Bank.
New Orleans Gt. Northern.....	1941	600,000	6	.....	.....	.....	.....
New York Central, Series 1929.....	1944	5,280,000	4½	98.657	4.715	4½-4.651	Bankers Co., of N. Y., Continental Ill. Co., Evans, Stillman & Co.
New York Central, Series 1930.....	1945	3,945,000	4½	99.71	4.5456	4-4½	Salomon Bros. & Hutzler.
N. Y., N. H. & H., Series 1930.....	1945	4,545,000	4½	97.72	4.875	4½-4¾	Syndicate headed by First National Bk., of N. Y., Salomon Bros. & Hutzler
Pere Marquette, Series 1930.....	1945	5,100,000	4¾	99.137	4.636	4-4.55	Bankers Co. of N. Y., Continental Illinois Co., and Evans, Stillman & Co.
Reading, Series M.....	1945	7,080,000	4½	99.8375	4.5263	4. -4.40	Edward Lowber, Stokes & Co.
St. Louis-San Francisco, Series DD.....	1945	8,085,000	4½	98.034	4.813	4½-4.70	First Nat'l Old Colony Corp., and associates.
St. Louis Southwestern.....	1945	810,000	4½	99.344	4.604	3¼-4½	Freeman & Co.
Seaboard Air Line.....	1945	3,510,000				4.25-5.20	Freeman & Co.
Southern Pacific, Series M.....	1945	6,000,000	4½	99.355	4.6017	4.25-4.50	Freeman & Co., Chase Security Corp.

Security Issues

Bond financing by the railroads was heavy during the year, the Wall Street Journal's tabulation showing a total of $779,132,000 for the first eleven months of the year, a total in excess of that for many years past. This was accounted for by the occurrence during the late summer of the most favorable bond market which has existed for a number of years and several roads took advantage of the occasion to care for accumulated requirements for additional funds. Note financing totaled $127,918,000, but stock financing fell to $63,805,600 the lowest figure since 1926; not at all surprising in view of stock market conditions and the low rate of return on railway investment.

Among the larger issues of stock were $18,000,000 sold by the Pennsylvania at par to officers and employees, an issue of similar amount sold pro rata to

Table IV—Receiverships Established in 1930

Name of road	Mileage	Funded debt outstanding	Capital stock outstanding
Chicago, Springfield & St. Louis	87	$500,000	$204,960
Jacksonville & Havana	60*	300,000	160,810
Seaboard Air Line	4490	189,569,974	85,145,250
Waco Beaumont, Trinity & Sabine	115	330,000	1,113,000
Total four companies	4752	$190,699,974	$86,624,020

* This company has the right to operate over the line of the Chicago, Burlington & Quincy between Jacksonville and Waverly, a distance of 17.95 miles.

Table V—Foreclosure Sales in 1930

Name of road	Mileage	Funded debt outstanding	Capital stock outstanding
Chicago & Alton	1029	$84,184,000	$39,955,500
White River	19	279,000	250,000
Two companies	1048	$84,463,000	$40,205,500

Table III—Railway Securities Sold to Public in 1916 and 1920 to 1930

Year	Bonds	Notes	Stock	Total R.R. financing	Total all financing	Per cent R.R. to total
1916	$229,000,000	$126,000,000	$16,000,000	$371,000,000	$1,864,000,000	19.90
1920	194,583,000	193,840,000	3,737,000	392,160,000	3,324,922,000	12.12
1921	455,125,000	202,928,300	27,222,500	685,275,800	2,780,874,000	24.64
1922	299,025,800	288,936,500	27,068,100	615,030,400	3,200,176,000	19.22
1923	165,956,000	354,720,500	59,140,850	579,817,350	3,602,704,000	16.04
1924	620,347,000	351,276,200	11,000,000	982,623,200	4,185,590,000	23.46
1925	374,020,500	151,753,740	30,934,430	556,708,670	5,234,992,000	10.63
1926	241,954,000	172,477,000	41,577,200	456,008,200	5,746,354,000	7.94
1927	686,939,500	89,184,600	210,596,900	986,721,000	7,830,641,000	12.61
1928	525,719,000	79,911,000	187,369,100	792,999,100	8,473,880,000	9.4
1929	581,156,000	26,860,000	209,179,885	817,195,885	10,036,361,000	8.1
*1930	779,132,000	127,918,000	63,805,600	990,855,600	5,760,572,500	17.2

* 11 months 1930.

stockholders by the Chesapeake & Ohio, and an issue of $7,500,000 sold to officers and employees by the New York Central. Two companies, the Chesapeake & Ohio and the Canadian Pacific, split their $100-par stock by four into $25-par in order to place the issues more readily in the hands of small investors. The C. & O. also sold some 20 millions of stock to stockholders in

(Continued on page 106)

Table VI—Railroad Mileage in the Hands of Receivers

(Figures to 1928, Inclusive, from I. C. C. Statistics for Year Ended December 31, 1928. Figures for 1929 and 1930 Compiled by *Railway Age*)

Year ended	Miles of road operated by receivers at close of year	Net change during the year in miles of road operated	Number of roads in charge of receivers at close of year
June 30, 1894	40,819	.....	192
1895	37,856	—2,963	169
1896	30,476	—7,380	151
1897	18,862	—11,614	128
1898	12,745	—6,117	94
1899	9,853	—2,892	71
1900	4,178	—5,675	52
1901	2,497	—1,681	45
1902	1,475	—1,022	27
1903	1,185	—290	27
1904	1,323	+138	28
1905	796	—527	26
1906	3,971	+3,175	34
1907	3,926	—45	29
1908	9,529	+5,603	52
1909	10,530	+1,001	44
1910	5,257	—5,273	39
1911	4,593	—664	39
1912	9,786	+5,193	44
1913	16,286	+6,500	49
1914	18,608	+2,322	68
1915	30,223	+11,615	85
1916	37,535	+7,130	94
Dec. 31, 1916	34,804	— 2,550*	80
1917	17,376	—17,428	82
1918	19,208	+1,832	74
1919	16,590	—2,618	65
1920	16,290	—300	61
1921	13,512	—2,778	68
1922	15,259	+1,747	64
1923	12,623	—2,636	64
1924	8,105	—4,518	61
1925	18,687	+10,582	53
1926	17,632	—1,055	45
1927	16,752	—880	40
1928	5,256	—11,496	33
1929	5,703	+447	29
1930	8,227	+2,524	26

* Represents decrease for six months.

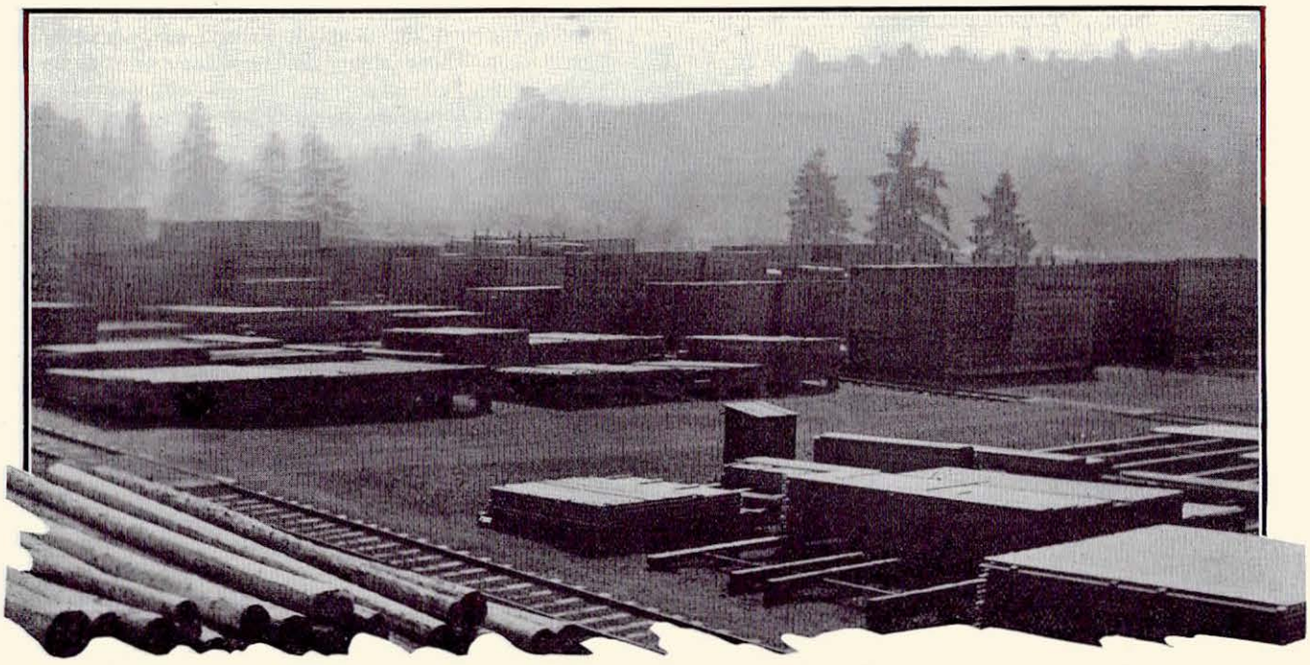
Table VII—Railroads in the Hands of Receivers on December 31, 1930

Road	Mileage operated	Mileage owned	Date of receivership	Funded debt outstanding	Capital stock outstanding	Total old company securities	Remarks
Alabama, Florida & Gulf	32	32	June 23, 1924	.....	.....	.....	Receivership terminated in March, 1929, but reorganization not yet effected.
Bridgeton & Saco River	21	21	Oct. 1, 1927	$170,000	$102,250	$272,250	
California & Oregon Coast	15	15	Feb. 19, 1925	528,200	350,000	903,200	
Cape Girardeau Northern	15	104	April 14, 1914	1,156,000	110,000	1,441,900	
Caro Northern	17	17	July 23, 1919	.....	.....	.....	
Chicago, Springfield & St. Louis	87	79	Jan. 24, 1930	500,000	204,960	704,960	
Gainesville & Northwestern	37	35	Dec. 8, 1923	75,000	750,000	850,000	
Gainesville Midland	74	72	Feb. 15, 1921	949,285	550,000	1,499,285	See *Railway Age*, Jan. 5, 1929, page 67.
Georgia & Florida	469	425	Oct. 19, 1929	7,446,000	13,382,441	21,978,441	Capital stock includes 100,000 shares common of no par value.
Jacksonville & Havana	(a) 60	42	Feb. 1, 1930	300,000	160,810	460,810	
Kansas & Oklahoma	15	19	April 17, 1923	None	288,900	288,900	
Minneapolis & St. Louis	1,628	1,514	July 26, 1923	41,359,051	25,792,600	70,730,573	
Missouri & North Arkansas	365	335	May 5, 1927	3,500,000	3,000,000	7,037,000	
Nevada Copper Belt	41	41	April 2, 1925	622,000	.....	622,000	
North & South	41	41	Aug. 1, 1924	None	None	None	Court order judgments, $4,911,771.
Ohio & Kentucky	40	(b) 38	Dec. 2, 1925	447,775	300,000	757,775	
Oklahoma Union	19	19	July 1, 1929	750,000	1,340,950	2,090,950	
Pittsburg, Shawmut & Northern	199	178	Aug. 1, 1905	14,655,600	15,000,000	31,382,685	
Rio Grande Southern	174	174	Dec. 16, 1929	4,509,000	4,510,000	9,019,000	
Sandy River & Rangeley Lakes	97	97	July 8, 1923	837,000	340,000	1,177,000	
Seaboard Air Line	4,490	3,448	Dec. 23, 1930	189,569,974	85,145,250	300,840,551	
Tallulah Falls Railway	57	57	June 24, 1923	1,519,000	323,400	1,852,400	
Virginia Southern	8	8	May 3, 1926	75,000	25,000	100,000	
Waco, Beaumont, Trinity & Sabine	115	115	Feb. 8, 1930	330,000	1,113,000	1,503,000	
Wichita Northwestern	100	100	Nov. 10, 1922	381,750	1,690,000	2,121,750	
Winifrede Railroad	11	11	Mar. 15, 1927	None	150,000	150,000	

(a) This company has the right to operate over the line of the Chicago, Burlington & Quincy between Jacksonville and Waverly, a distance of 17.95 miles.
(b) Includes leased line also

Table VIII—Summary of Railroad Receiverships and Foreclosure Sales, 1876 to 1930

	Roads Placed in Receivership			Summary of Foreclosure Sales		
Year	Number of roads	Miles	Bonds and stocks	Number of roads	Miles	Bonds and stocks
1876	42	6,662	$467,000,000	30	3,840	$217,848,000
1877	38	3,637	220,294,000	54	3,875	198,984,000
1878	27	2,320	92,385,000	48	3,906	311,631,000
1879	12	1,102	39,367,000	65	4,909	243,288,000
1880	13	885	140,265,000	31	3,775	263,882,000
1881	5	110	3,742,000	29	2,617	137,923,000
1882	12	912	39,074,000	16	867	65,426,000
1883	11	1,990	108,470,000	18	1,354	47,100,000
1884	37	11,038	714,755,000	15	710	23,504,000
1885	44	8,836	385,460,000	22	3,156	278,394,000
1886	13	1,799	70,346,000	45	7,687	374,109,000
1887	9	1,046	90,318,000	31	5,478	328,181,000
1888	22	3,270	186,814,000	19	1,596	64,555,000
1889	22	3,803	99,664,000	25	2,930	137,815,000
1890	26	2,963	105,007,000	29	3,825	182,495,000
1891	26	2,159	84,479,000	21	3,223	169,069,000
1892	36	10,508	357,692,000	28	1,922	95,898,000
1893	74	29,340	1,781,046,000	25	1,613	79,924,000
1894	39	7,025	395,791,000	42	5,643	318,999,000
1895	31	4,089	369,075,000	52	12,831	761,791,000
1896	34	5,441	275,597,000	58	13,730	1,150,377,000
1897	18	1,537	92,909,000	42	6,675	517,680,000
1898	18	2,069	138,701,000	47	6,054	252,910,000
1899	10	1,019	52,285,000	32	4,294	267,534,000
1900	16	1,165	78,234,000	24	3,477	190,374,000
1901	4	73	1,627,000	17	1,139	85,808,000
1902	5	278	5,835,000	20	693	39,788,000
1903	9	229	18,823,000	13	555	15,885,000
1904	8	744	36,069,000	13	524	28,266,000
1905	10	3,593	176,321,000	6	679	20,307,000
1906	6	204	55,042,000	8	262	10,400,000
1907	7	317	13,585,000	6	114	13,777,000
1908	24	8,009	596,359,000	3	138	2,547,000
1909	5	859	78,095,000	12	2,629	250,033,000
1910	7	735	51,427,500	17	1,100	93,660,109
1911	5	2,606	210,606,882	13	1,386	40,741,543
1912	13	3,784	182,112,497	12	661	25,910,990
1913	17	9,020	477,780,820	6	1,159	86,163,850
1914	22	4,222	199,571,446	9	1,470	83,189,500
1915	12	20,143	1,070,808,628	11	3,914	285,258,782
1916	9	4,439	208,159,689	26	8,355	703,444,855
1917	19	2,486	61,169,962	20	10,963	557,846,348
1918	8	3,519	242,090,800	11	763	24,735,187
1919	7	244	11,886,779	8	459	15,479,587
1920	10	541	21,620,150	7	380	7,676,200
1921	14	1,744	63,872,113	11	4,173	306,123,942
1922	12	4,330	329,114,860	15	6,151	299,491,646
1923	10	2,218	87,913,581	8	637	14,622,900
1924	11	920	30,223,372	14	3,992	269,251,082
1925	6	11,368	680,422,080	6	638	9,965,000
1926	6	88	2,821,400	12	12,852	626,662,708
1927	6	924	45,236,674	5	142	4,254,000
1928	1	19	529,000	4	209	6,393,250
1929	3	634	30,981,391	5	562	20,715,065
1930	4	4,752	277,323,994	2	1,048	124,668,500



The Lumber Yard of the Northern Pacific at Tacoma, Wash.

Prices of Railway Materials Fall in 1930

General business slump forced many values to lowest levels in years—Few exceptions to downward trend

By David A. Steel

Purchases and Stores Editor, Railway Age

THERE was a definitely downward trend in the prices at which railway materials could be bought during 1930, although the movement was less noticeable among materials peculiar to the railways than with those in general use. Here and there the railroads paid slightly more for supplies last year than in 1929, and the instances were frequent where one price prevailed throughout the year. Car fittings and lubricants are examples. The standard price of $43 a net ton for rails has not changed since it was established in 1923. With most materials, however, lower prices were paid in 1930 than in 1929 and the general movement was downward throughout the year.

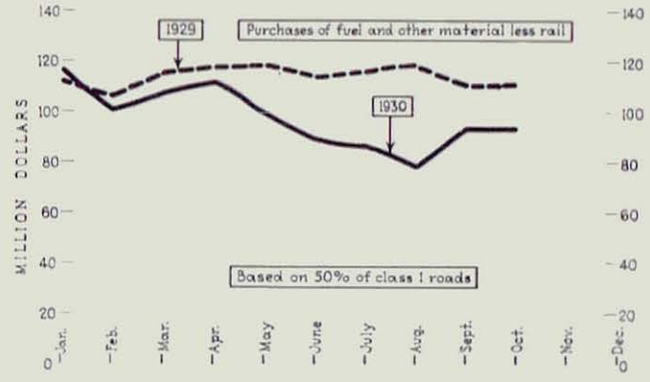
The trend, as a matter of fact, was pronounced, and the year ended with many prices, notably lumber, rolling mill products and non-ferrous materials, at the lowest levels in years. At one time last year the prices of copper and of certain grades of scrap iron were the lowest in 30 years. Twenty per cent reductions were common among lumber items and many roads could have bought cross ties at their own price.

Prices Down 10 Per Cent

An analysis of the prices paid by 14 roads in different sections of the country shows that 10 of them paid less for their fuel in 1930 than in 1921, while the other 3 paid approximately the same as before. Ten of 13 roads bought iron and steel cheaper. Only one of these roads reported comparable prices for lumber, the others paying less. One of the 13 roads paid a little more for ties and 2 approximately the same prices as before, while the other 11 roads paid considerably less. All of the roads were obliged to sell their scrap iron from 10 to 20 per cent less. On the whole, the prices of commodities bought by the railroads in sizable quantities during the year ranged from 2 per cent to 30 per cent lower and averaged about 10 per cent less than the prices paid in 1929.

A Business Slump

The recession of prices reflects in part, but only in part, the continued active competition, mass production and other forces which were responsible for the gradual downward movement of prices that took place before 1929, despite expanding business. The primary reason is rather to be found in the general business inactivity. The railroads, in keeping with public pledges made in the interest of business stability, continued buying equipment and supplies at a relatively high rate throughout the year and were thus a big factor in the markets,



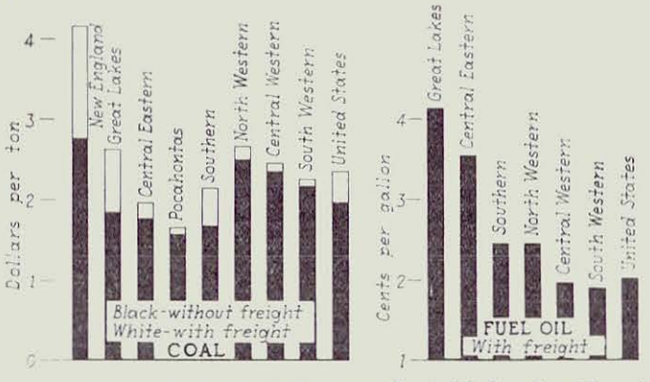
Approximate Trend of Railway Purchases Developed from Preliminary Returns from Forty Class I Railways

particularly in the iron and steel market where they regained their place as the country's largest buyer.

Railway purchasing fell somewhat short, however, of that in previous years. Fuel purchases were under those in 1929 on 28 of 32 roads reporting expenditures for the first 9 months of both years and were above those for the same period on but 4 of these roads, the reduction in the total fuel purchases of these roads averaging 10 per cent. Eleven of the roads bought more rails, but the tonnage was less on the others and averaged 25 per cent less for the aggregate. Fourteen roads bought more lumber and ties but 18 bought less, reducing aggregate purchases 10 per cent, and all but 4 of these roads bought smaller quantities of miscellaneous materials, the aggregate averaging 17 per cent less for the 9 months.

Special reports received from roads having 50 per cent of the railway buying power show that the purchases of fuel and all miscellaneous materials were fairly comparable with those in 1929 during the first quarter of the year, but fell off sharply until in August they were 30 per cent below those of August, 1929. Purchases increased again in the fall, but the aggregate purchases for the year were approximately 15 per cent less than they were in 1929.

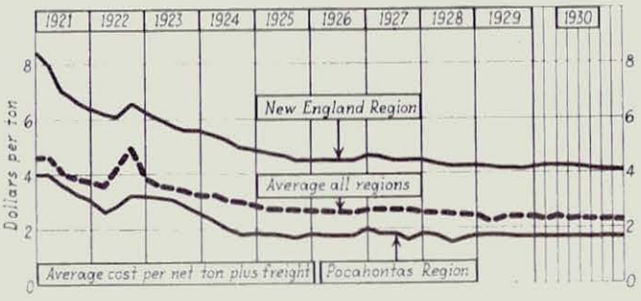
Prices this year will depend somewhat on how well various industries can control their production. The copper industry managed to start the price of copper upward before the end of the year. Prices will also be influenced by the willingness of large buyers, such as the railroads, to refrain from encouraging price cutting wars at a time when prices can easily be forced below levels necessary to healthy business. An increase in prices will, however, require increased consumption, a condition which, at least to an extent that will materially affect prices, does not appear to be an immediate possibility.



Average Regional Costs of Coal and Fuel Oil for the Class I Railways in 1930

Four of 14 railway purchasing agents in different sections forecast increases in their fuel purchases, six expect to purchase about the same amount of fuel as last year and four expect to buy less. The forecast for rail buying is about the same. Three of 13 roads reporting expect to buy more lumber, three expect to buy approximately the same quantity and seven roads expect to buy substantially less. Two roads of 13 expect to buy more ties; six, about the same quantity and five less. Five of 11 roads expect to buy more miscellaneous materials; two the same quantity; while smaller purchases are forecast on four others.

Six of ten purchasing agents venturing forecasts as to prices this year anticipate no change in the price of their fuel, while three look for lower prices, based in one case upon a reduction effected in freight rates. Three of ten roads expect no change in iron and steel prices, while six look for higher prices after the first quarter. Five of ten buyers expect to see lumber prices strengthen; three look for no change in the prices and one purchasing agent thinks the year will see further weakness. Five roads expect no change in their costs, two look for lower prices and three roads expect to pay



Trend of Average Regional Coal Costs for the Class I Railroads, as Reported to I. C. C.

more. All but two purchasing agents think the prices paid for scrap iron will recover somewhat.

The continued and successful efforts of business in general and the railroads in particular to keep their inventories from getting out of hand and the reluctance of consumers generally to take advantage of the reduced prices of materials by buying beyond immediate needs are fortuitous circumstances, exercising as they do a stabilizing influence on business. It is improbable, however, that the first three months will see any noticeable increase in the rate of purchasing or any increases in prices over the level reached in 1929, except some strengthening of steel prices. During November, the mills announced increases of $1.00 per ton in steel products for the first quarter of this year.

Fuel Costs

For the most part, the roads secured reductions in the cost of coal, ranging from a few cents to 50 cents a ton, netting an average reduction to all roads of 15 cents a ton, or approximately 7 per cent from 1929 costs.

The rate of coal production was approximately 1,000,000 tons per week less, or about 10 per cent less than in 1929, and showed no signs of overtaking the previous year's rate of production during the closing weeks. If the railroads had been committed to the policy of buying distress coal instead of purchasing their requirements on contracts at so-called fair prices to the industry, the reductions in their coal costs would have

been greater. The coal industry is faced with the competition of oil and the increasing use of natural gas, and the capacity of mines is never overtaxed. Conditions are such that a strike threatened in Illinois last October and another strike that developed in Kentucky caused no concern to the railroads. It is probable that coal will be contracted for by many railroads in 1931 at slightly lower prices than were paid even during 1929.

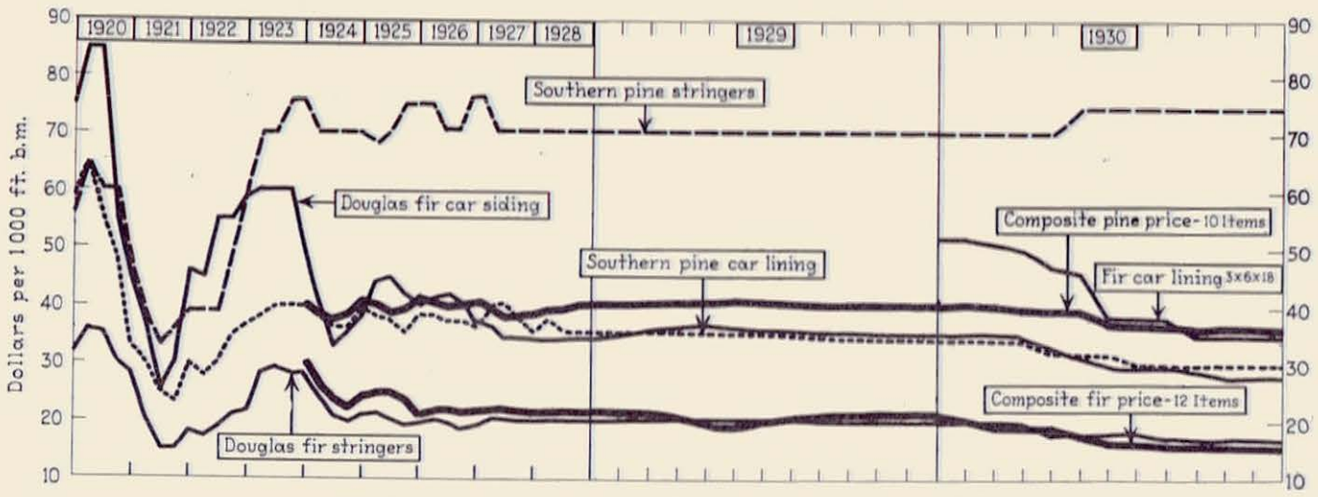
The consumption of fuel oil by railroads in locomotives is increasing and more than a dozen roads are now using fuel oil altogether, as will appear from the table of coal prices. While this trend and also the increase in the use of crude oil for industrial uses, as well as the drastic attempt to curtail output, operate to increase the price, the oil industry was again disturbed last year by extraordinary flows from newly-developed wells and by a reduced consumption elsewhere than on the railways. As a result, fuel oil was available to some buyers last year at figures as low as 50 cents a barrel, and several roads showed reductions of from 15 cents to 40 cents a barrel on tank lot purchases as the year advanced. The year closed with 12 roads paying from 40 cents to 70 cents per bbl. on the tank lot basis, an average reduction of 10 per cent from the cost in 1929.

Average Cost of Coal Per Ton—First Nine Months

Region and road	With freight 1930	With freight 1929	Without freight 1930	Without freight 1929
New England Region:				
Atlantic & St. Lawrence	$4.98	$5.05	$2.07	$2.05
Bangor & Aroostook	4.59	4.58	4.59	4.58
Boston & Albany	4.28	4.31	1.94	1.90
Boston & Maine	4.56	4.55	4.56	4.55
Canadian Pacific (lines in Maine)	5.43	5.51	4.26	4.22
Canadian Pacific (lines in Vermont)	5.04	5.25	1.94	2.10
Central Vermont	4.66	4.75	1.79	1.62
Maine Central	4.85	4.79	4.85	4.79
New York, New Haven & Hartford	3.48	3.67	1.18	1.36
Rutland	3.99	4.06	2.37	2.36
Great Lakes Region:				
Ann Arbor	3.02	3.01	1.24	1.24
Buffalo, Rochester & Pittsburgh	1.75	1.74	1.75	1.74
Delaware & Hudson	3.14	3.74	2.35	3.17
Delaware, Lackawanna & Western	3.16	3.27	1.83	2.03
Detroit & Mackinac	3.54	3.96	1.27	1.37
Detroit & Toledo Shore Line	3.38	3.49	2.04	2.06
Erie and Chicago & Erie	2.40	2.53	1.70	1.70
Grand Trunk Western	3.04	3.17	1.38	1.47
Lehigh & Hudson River	3.70	3.84	1.33	1.31
Lehigh & New England	2.89	3.12	1.36	1.76
Lehigh Valley	3.17	3.28	1.33	1.42
Michigan Central	3.57	3.60	2.39	2.43
Monongahela	1.58	1.59	1.58	1.59
Montour	2.01	2.01	2.01	2.01
New Jersey & New York	4.74	4.77	1.89	1.92
New York Central	2.26	2.37	1.86	1.95
New York, Chicago & St. Louis	2.66	2.71	1.73	1.78
New York, Ontario & Western	2.96	3.14	1.17	1.41
New York, Susquehanna & Western	4.41	4.42	1.85	1.87
Pere Marquette	3.39	3.39	1.58	1.57
Pittsburgh & Lake Erie	1.77	1.83	1.65	1.66
Pittsburg & Shawmut	2.22	2.25	2.22	2.25
Pittsburgh & West Virginia	1.25	1.49	1.25	1.49
Pittsburg, Shawmut & Northern	1.80	1.80	1.80	1.80
Ulster & Delaware	4.24	4.29	1.67	1.72
Wabash	2.24	2.10	1.78	1.83
Central Eastern Region:				
Akron, Canton & Youngstown	2.48	2.51	1.46	1.50
Atlantic City	3.50	3.54	1.84	1.88
Baltimore & Ohio	1.56	1.60	1.53	1.57
Bessemer & Lake Erie	2.00	2.01	1.92	1.93
Buffalo & Susquehanna	1.62	1.65	1.62	1.65
Central of New Jersey	3.44	3.47	1.54	1.55
Chicago & Eastern Illinois	1.98	2.08	1.94	2.04
Chicago & Illinois Midland	1.90	1.92	1.90	1.92
Chicago, Indianapolis & Louisville	1.85	1.92	1.85	1.92
Cleveland, Cin., Chic. & St. Louis	2.36	2.65	2.00	1.95
Detroit, Toledo & Ironton	2.78	2.94	1.71	1.88
Elgin, Joliet & Eastern	2.11	2.21	2.11	2.21
Illinois Terminal	2.64	2.73	2.64	2.70
Long Island	3.85	3.84	1.62	1.64
Missouri-Illinois	1.75	2.00	1.75	2.00
Pennsylvania System	1.82	1.85	1.79	1.82
Reading Company	2.88	2.85	1.69	1.69
Staten Island Rapid Transit	4.09	4.12	1.75	1.78
Western Maryland	1.81	1.83	1.80	1.83
Wheeling & Lake Erie	1.55	1.67	1.55	1.67
Pocahontas Region:				
Chesapeake & Ohio	1.62	1.63	1.62	1.63
Norfolk & Western	1.57	1.58	1.57	1.58
Richmond, Fred. & Potomac	3.45	3.40	1.27	1.16
Virginian	1.95	1.96	1.95	1.96
Southern Region:				
Alabama Great Southern	2.41	2.46	1.93	2.02
Atlanta & West Point	3.05	3.10	1.70	1.78
Atlanta, Birmingham & Coast	1.93	2.23	1.51	1.82
Atlantic Coast Line	2.94	3.06	1.39	1.53
Central of Georgia	2.20	2.23	2.11	2.12
Charleston & Western Carolina	2.75	2.84	1.38	1.47
Cin., New Orleans & Texas Pac.	2.00	2.07	1.73	1.78
Clinchfield	1.43	1.51	1.43	1.51
Columbus & Greenville	2.62	2.60	1.49	1.50
Florida East Coast		Oil Used		
Georgia	3.19	3.19	1.35	1.37
Georgia & Florida	3.04	3.23	1.50	1.50
Georgia, Southern & Florida	3.98	4.10	2.05	2.09
Gulf & Ship Island	3.44	3.47	1.53	1.56
Gulf, Mobile & Northern	2.00	2.08	1.26	1.36
Illinois Central System	2.02	2.02	1.80	1.81
Louisville & Nashville	1.77	1.80	1.77	1.80
Mississippi Central	2.74	2.82	1.22	1.29
Mobile & Ohio	2.02	2.04	2.02	2.04
Nashville, Chatt. & St. Louis	1.99	2.00	1.90	1.90
New Orleans & Northeastern	3.62	3.52	1.95	1.95
New Orleans Great Northern	2.76	2.71	1.30	1.27
Norfolk Southern	3.22	3.38	1.20	1.35
Northern Alabama	1.61	1.72	1.61	1.72
Seaboard Air Line	2.68	2.80	1.36	1.42
Southern	1.60	1.69	1.53	1.63
Tennessee Central	1.84	1.79	1.84	1.79
Northwestern Region:				
Chicago & North Western	1.86	2.17	1.86	2.17
Chicago Great Western	2.76	2.77	1.61	1.61
Chi., Mil., St. P. & Pacific	2.39	2.39	2.36	2.33
Chi., St. P., Minneapolis & Omaha	3.83	4.17	3.54	3.88
Duluth, Missabe & Northern	4.14	4.06	4.14	4.06
Duluth, South Shore & Atlantic	4.07	4.27	3.64	3.72
Duluth, Winnipeg & Pacific	4.09	4.56	3.81	4.32
Great Northern	3.37	3.61	3.36	3.55
Green Bay & Western	4.55	4.83	4.40	4.83
Lake Superior & Ishpeming	3.74	4.08	3.74	4.08
Minneapolis & St. Louis	2.20	2.47	2.00	2.40
Minneapolis, St. Paul & S. S. Marie	3.71	3.86	3.22	3.35
Northern Pacific	2.69	2.68	2.69	2.68
Oregon-Wash. R. R. & Nav. Co.	3.97	3.68	2.27	2.24
Spokane International	5.15	5.43	3.24	3.53
Spokane, Portland & Seattle		Oil Used		
Central Western Region:				
Atchison, Topeka & Santa Fe	2.98	2.96	2.93	2.88
Bingham & Garfield	4.03	4.13	1.65	2.63
Chicago & Alton	2.23	2.19	2.23	2.19
Chicago, Burlington & Quincy	2.17	2.17	2.12	2.13
Chicago, Rock Island & Gulf	5.22	5.05	2.72	1.90
Chicago, Rock Island & Pacific	2.49	2.50	2.29	2.33
Colorado & Southern	2.77	2.90	2.73	2.85
Denver & Rio Grande Western	1.97	2.05	1.96	2.04
Denver & Salt Lake	1.25	1.18	1.25	1.18
Fort Worth & Denver City	5.89	6.15	2.94	3.06
Los Angeles & Salt Lake		Oil Used		
Nevada Northern	4.55	4.55	1.75	1.75
Northwestern Pacific		Oil Used		
Oregon Short Line	3.16	3.18	2.59	2.60
Quincy, Omaha & Kansas City	2.63	2.66	2.63	2.61
St. Joseph & Grand Island	3.56	3.62	3.17	3.21
San Diego & Arizona		Oil Used		
Southern Pacific System	3.02	2.90	3.02	2.90
Toledo, Peoria & Western	2.85	2.71	1.45	1.30
Union Pacific	2.54	2.54	2.51	2.52
Utah	1.06	.82	1.06	.82
Western Pacific	3.11	3.18	1.88	1.90
Southwestern Region:				
Burlington-Rock Island		Oil Used		
Fort Smith & Western	3.47	3.47	3.47	3.47
Fort Worth & Rio Grande		Oil Used		
Gulf Coast Lines		Oil Used		
Gulf, Colorado & Santa Fe		Oil Used		
International-Great Northern		Oil Used		
Kansas City Southern	2.50	2.70	2.50	2.68
Kansas, Oklahoma & Gulf	2.61	2.63	2.61	2.63
Louisiana & Arkansas		Oil Used		
Louisville, Arkansas & Texas		Oil Used		
Midland Valley	2.65	2.59	2.65	2.59
Missouri & North Arkansas	2.86	2.89	1.35	1.36
Missouri-Kansas-Texas Lines	2.99	3.04	2.69	2.67
Missouri Pacific	2.16	2.35	2.09	2.28
St. Louis-San Francisco	2.38	2.44	2.24	2.28
St. Louis, San Francisco & Texas	4.30	3.94	3.22	3.14
St. Louis Southwestern	2.20	2.24	1.33	1.37
Texas & New Orleans		Oil Used		
Texas & Pacific		Oil Used		
Texas Mexican		Oil Used		
Wichita Falls & Southern		Oil Used		
Wichita Valley		Oil Used		
Average	2.84	2.98	2.08	2.14

Lumber Prices Off 20 Per Cent

Lumber particularly went begging for buyers last year, with building operations at the lowest ebb in years, railway buying greatly reduced, export business cut off by depression in other lands, and substitutes nibbling at the lumber market. In the south, the cutting of large timbers of select quality is now restricted to a greatly reduced number of mills, which are closely knit together in trade associations for the better control of production. As a result, the price of such select stock as bridge stringers was sustained during the year. Except for such materials, and particularly those in the production of which small mills could participate, heavy re-



Mill Price Trends of Typical Lumber Items from 1920 to 1930

ductions in prices occurred, notwithstanding the sudden large market that was created for southern pine by the hurricane in the West Indies. Low grades of southern pine could be bought for $10 a thousand last year. A $5 reduction per thousand ft. B.M. in car lining and a $7 reduction in car decking were representative of railway purchases and the composite price of 10 items was 10 per cent lower in the fall than in the spring.

Coast Mills Close

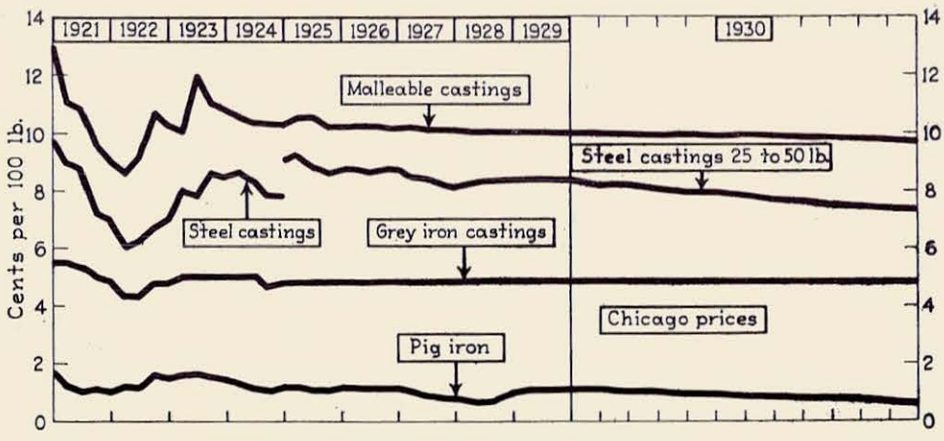
In 1929, prices of forest products on the West Coast were so low that many producers attempted to increase their output per man by installing improved machinery or otherwise speeding up operations. But, with reduced consumption last year, the so-called bed-rock prices of 1929 for fir weakened and many mills operated at a loss for months. Rather than face winter operations under such conditions, some mills closed down, but others continued to operate, regardless of prices, to maintain their credit. A recent survey of 127 mills in the Oregon district showed that 67 have closed down indefinitely, and it is unlikely that some of them will reopen this year.

In Western Canada, timbers which cost $17 and $18 per thousand ft. B.M. in 1929 sold for around $13 per thousand last fall. Car sheeting, 1 in. by 4 in. by 9 ft., ranging from $33 to $35 per thousand ft. B.M. in 1929 could be bought last fall at $27 per thousand ft. B.M. and was expected to go still lower. Dressed select common car decking costing about $18 per thousand in 1929 was sold last fall for $15. Yard stocks were purchased for less than the cost of No. 2 and No. 3 logs, and commercial boards and dimensions were sold in many cases far below pre-war prices.

On the whole, West Coast prices declined from 10

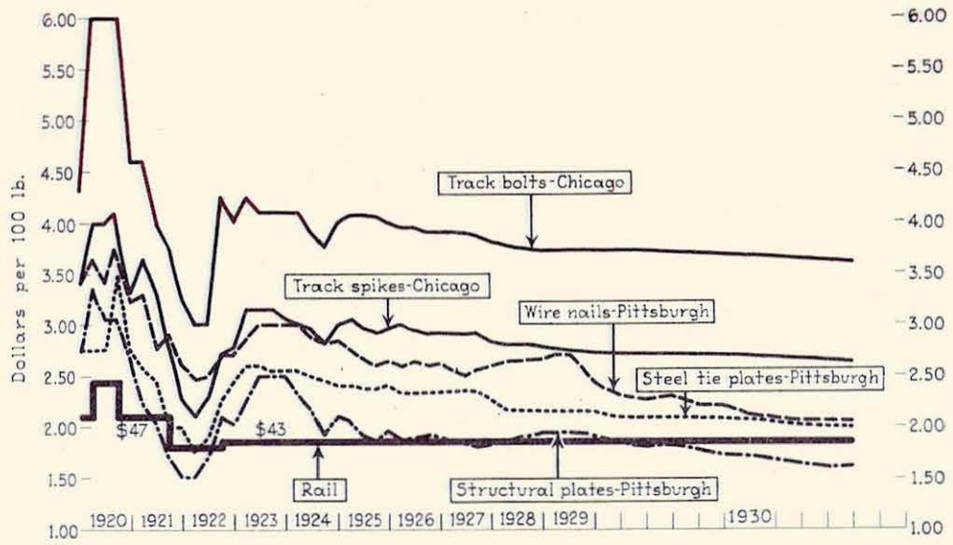
Prices Paid by Railroads for Material in 1930

Material	Unit	Roads	Highest	Lowest	Year Average	In-deg.
Maintenance of Way Materials						
Tie plates, steel	n.t.	13	$45.00	$38.50	$41.22	98
Track, bolts, com., heat-treated, with nuts	cwt.	14	5.90	3.60	3.97	97
Track chisels	ea.	13	1.80	1.25	1.71	99
Track spikes, high carbon steel	cwt.	13	2.86	2.48	2.68	99
Wire fence, 26-in. woven	rod	12	.50	.25	.43	95
Track shovels, No. 2	doz.	14	14.00	7.88	9.85	88
Wire bond, 48-in. copper clad	cwt.	7	19.31	15.61	17.14	89
Pipe, cast iron, 12-in. Class B	n.t.	10	51.20	34.95	40.37	97
Pipe, clay, 24-in. vitrified	ft.	10	2.02	.68	1.27	90
Soda ash, water softening	cwt.	14	2.47	1.29	1.55	100
Hydrated lime, water softening	n.t.	12	12.10	7.25	9.53	92
Cement, Portland, less sacks	bbl.	14	2.15	1.40	1.75	98
Steel, structural, angles	cwt. base	13	2.60	1.60	1.98	84
Steel, structural, fabricated	cwt. base	11	4.00	3.10	3.35	91
Creosote oil, tank lots	gal.	10	.16	.095	.125	95
Shop and Equipment Materials						
Bolts, ¼ by 6 mach., with nuts	100 pcs.	14	6.72	4.08	4.80	92
Boiler tubes, 2-in. No. 11 gage steel	ft.	14	.166	.150	.155	87
Fire brick, soft	per M	13	45.50	36.00	41.85	100
Copper, sheet soft	lb.	12	.318	.158	.259	75
Copper tubing, ⅜-in.	lb.	12	.47	.16	.26	70
Pig lead	cwt.	12	7.50	4.80	5.64	80
Iron, common bar	cwt. base	6	2.10	1.70	1.89	89
Steel, spring	cwt. base	13	3.60	1.60	2.62	97
Steel, high speed tool	lb. base	13	.90	.50	.65	98
Rope, ¾-in. 6-str. plow steel	cwt.	9	.17	.12	.14	105
Steel, boiler	cwt. base	14	2.72	1.46	2.01	90
Steel, 24-gage black	cwt.	11	3.79	2.35	2.90	85
Brake shoes, locomotive driving	n.t.	12	58.00	57.00	58.75	98
Brake shoes, freight	n.t.	11	36.00	32.00	35.11	95
Castings, grey iron, green sand	cwt.	12	5.02	3.75	4.12	99
Castings, malleable, 7 to 15 lb. 25-100 pcs.	cwt.	14	10.00	5.25	8.27	98
Castings, steel-car, 25 to 50 lb., under 50 pcs.	cwt.	14	10.55	4.95	8.05	90
Journal bearings	lb.	9	.219	.105	.145	75
Couplers, 5 by 7 by 6½ M.C.B. car	pr.	14	42.50	31.55	38.25	97
Pipe, 1-in. black steel standard	ft.	12	.101	.048	.069	95



rend of Mill Prices for Materials Used in Car and Locomotive Work

Trend of Prices of Typical Iron and Steel Items Used in Roadway and Maintenance



Material	Unit	Roads	Highest	Lowest	Year Average	In-deg.
Wire nails, common	cwt. base	14	3.25	1.90	2.29	85
Wire, No. 9 bare	lb.	12	.245	.111	.163	85
Wire, T.B. weather No. 10	cwt.	13	.250	.109	.190	90
Fuel oil, tank lots	bbl.	9	1.10	.40	.62	90
Iron, No. 1 pig	g.t.	3	19.00	14.50	16.60	95
Axles, locomotive driving	cwt.	13	5.50	2.95	4.29	99
Axles, 5 by 9 rough turned car	cwt.	13	3.15	2.75	2.80	98
Tires, frt. loco., 33-in. and over	cwt.	14	6.70	5.60	6.15	100
MISCELLANEOUS MATERIALS						
Oil, car—tank lots	gal.	12	.214	.140	.163	95
Grease, driving box	lb.	12	.150	.125	.130	100
Waste, colored cotton	lb.	14	.120	.057	.085	95
Kerosene, long-time—in tanks	gal.	12	.143	.050	.085	95
Boiler lagging, 1¼-in.	sq. ft.	11	.180	.152	.160	100
Rubber, 3/32 sheet packing	lb.	10	.48	.15	.20	100
Hose, air brake, 1⅜ by 22	ft.	11	.45	.41	.44	100
Leather, belting, 6-in. double	ft.	13	1.73	.82	1.35	95
Rope, ¾-in. manila	lb.	13	.215	.110	.180	85
Glass, 24 by 24 dsa	box	13	7.08	4.89	5.80	110
Linseed oil, boiled	lb.	14	.153	.094	.130	93
White lead, in oil—100-lb. keg	lb.	13	.113	.105	.106	105
Oxygen	100 ft.	14	1.35	.65	1.05	99
TIES AND LUMBER						
Lumber, fir 1 by 6 No. 1 com. rough	M ft.	4	17.00	14.00	15.55	89
Lumber, pine 2 by 4 by 10 S4S No. 1 com	M ft.	8	35.00	18.00	25.85	95
Car sills, fir 6 by 10 by 40	M ft.	4	23.00	15.50	19.40	85
Bridge stringers, fir 8 by 16 by 28 struct.	M ft.	5	22.50	13.00	18.70	90
Cross ties, fir 7 by 9 by 8'6 untreated	ea.	3	.803	.714	.74	85
Cross ties, pine 7 by 9 by 8'6 untreated	ea.	9	1.00	.50	.75	95
Cross ties, white oak 7 by 9 by 8'6 untreated	ea.	10	1.25	.59	.92	85
SCRAP IRON						
Scrap iron, No. 1 railroad wrought	n.t.	10	11.75	6.92	8.70	85
Scrap iron, No. 1 melting steel	n.t.	11	14.19	6.92	10.62	80
Scrap iron, rails for re-rolling	n.t.	8	14.50	8.40	12.55	85

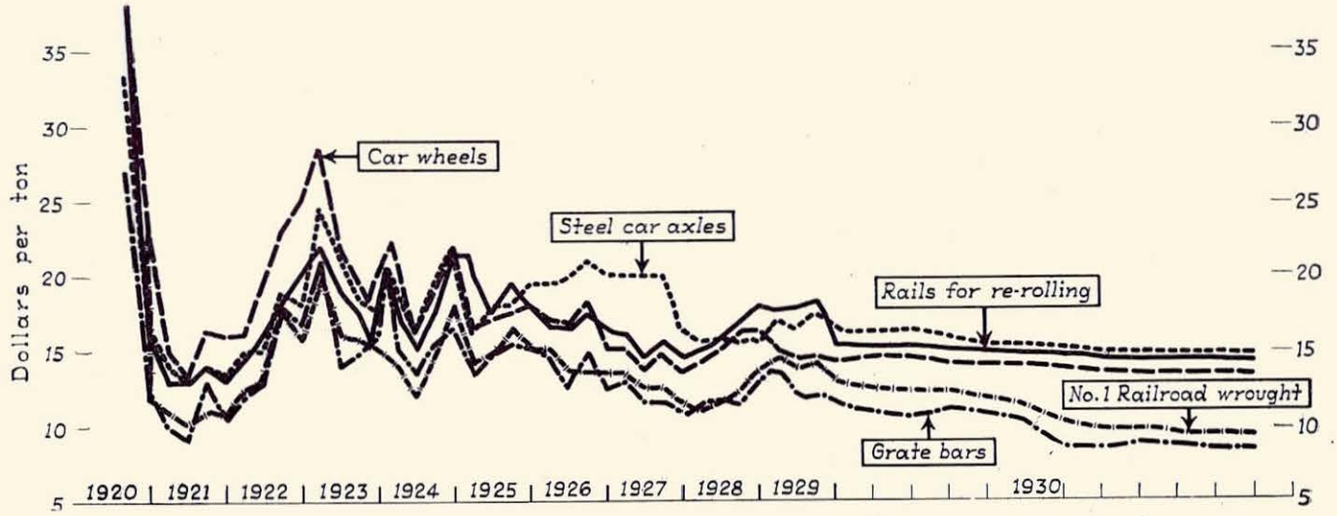
*Comparison of year's average with corresponding average for same roads in 1929, expressed in per cent. Does not reflect reductions obtained by individual roads.

to 25 per cent during 1929 and the composite price of 12 railroad fir items was $16 at the close of last year as compared with $20 in the spring. The only condition that is likely to strengthen the prices of lumber this year is a sudden demand for large quantities of special lumber which the mills may not be in a position to produce immediately, in view of the small inventories with which mills and users are attempting to operate.

Most of the roads paid from 10 to 15 cents less for cross ties last year and switch ties were purchased at prices ranging from $2 to $5 a thousand lower. This reduction in prices was precipitated not only by the reduced consumption of the railroads, but, in the south and west, a drought forced many producers of ties, particularly the small producers, to cut and sell ties at almost any price. Prices of No. 5 fir cross ties ranged from 71 cents to 80 cents on two roads late in 1930. The cost of No. 5 pine cross ties to 9 roads ranged from 50 cents to $1 at the close of the year, while white oak ties cost 10 roads from 59 cents to $1.35, including freight in some cases.

Iron and Steel Prices

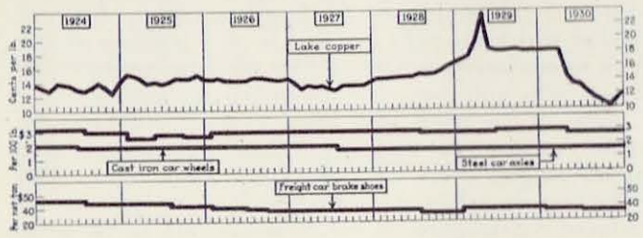
A study has been made of the prices paid by representative railroads of the country for 30 typical iron and steel products, 10 of these comprising materials for maintenance of way purposes and 20 for maintenance of equipment. A large quantity of these materials are



Trend of Prices Paid in the Chicago Market for Typical Scrap Iron Items

bought under quarterly or other term contracts, while others are bought only as required. There was considerable variation in the prices paid by the various roads for some of these commodities and no variation in others, but with practically every item, one or more roads made their purchases at lower prices than they paid in the previous year and in most cases the closing prices were the lowest for the year, the reductions ranging from 50 cents to $5 a ton.

The feature of iron and steel purchasing lay in the slight reductions the roads secured in track materials, as compared with the reductions in materials purchased for the maintenance of equipment. Attention has already been called to the fact that rails have not changed in price since 1923. Five of 13 roads reporting tie plate prices paid from $1 to $3 per ton less last fall than at the beginning of the year, while the price was stationary on the other roads. The prices to most roads, however, were from $1 to $1.50 a ton less than paid in 1928. Six of 14 roads paid the same price all year for track bolts, the other 8 securing reductions last fall ranging from 15 to 25 cents per 100 lb., and the closing prices, ranging from $3.27 to $4 per 100 lb., showed a slight reduction from the costs in 1929. With two unimportant exceptions, the prices paid by 12 roads for track chisels, ranging from $1.25 to $1.80 apiece throughout the year, were the same as in 1929. Five of the 13 roads paid the same throughout the year for track spikes as in 1929, while the others bought them for 10 cents per 100 lb. less than in the spring, with the exception of one road which paid 30 cents less. December prices ranged from $2.48 to $2.80.



Price Trends of Typical Shop and Equipment Items

Finished Products

Typical of the slight trend of many finished products, the prices paid for wire fencing, ranging from 25 cents to 49 cents a rod, was practically uniform throughout the year to all roads. Except for a reduction of $1 a dozen on one road, all railroads reporting track shovel purchases paid one price throughout the year, but these prices, ranging from $7.88 to $14 a dozen among the different roads, were from 65 cents to $3 a dozen less than were paid by the same roads in 1929. The prices paid for cast iron pipe last fall, ranging from $36 to $41 per net ton on 9 roads for Class B pipe, showed no fluctuation throughout the year, except on two roads, although some roads bought it for from $1 to $3 a ton lower than in 1929.

The prices paid late in 1930 for structural steel angles, ranging from $1.60 to $1.97, represented reductions of from $5 to $7 a ton from first-quarter prices on all roads, and reductions of from $3 to $14 a ton from 1929 average prices were secured by all roads reporting fabricated steel prices.

Shop and Equipment Steel

The closing prices of machine bolts, ranging from $4.08 to $5.25 per 100 lb. on 14 roads, were reductions of from $2 to $10 a ton for most of the roads during the year and corresponding reductions from the 1929 costs. The price of boiler tubes, ranging from 15 cents to 17 cents per ft. on 14 roads, held throughout the year, but represented a reduction of 2 cents per ft., or 10 per cent, from 1929 prices. The price of $1.70 per 100 lb. paid by one road for common bar iron plate in 1930 was a reduction of 25 cents per 100 lb. from the price paid the first quarter and also from the average cost for the year 1929.

Spring steel, purchased at prices ranging from $1.60 to $3.50 per 100 lb. on 13 roads in the last quarter, showed a reduction of $4 a ton to three roads during the year and a reduction of from $2 to $4 a ton on most of the roads from the 1929 costs. The prices paid for high-speed tool steel, ranging from 45 cents to 61 cents per lb. on 13 roads, were the same as were paid in 1929. The price of steel cable, ranging from 13 cents to 17 cents per ft., was practically the same throughout the year, but ranged from 1 cent to 6 cents per ft. less than was paid by the roads in 1929. The prices paid for boiler steel, ranging from $1.46 to $2.65 per 100 lb. last fall, showed reductions of from $4 to $6 a ton on all 14 roads during the year, and only 1 road of 11 failed to get reductions of from 20 to 60 cents per 100 lb. in the price of light sheet steel toward the close of the year, the last prices ranging from $2.35 to $3.54 per 100 lb., and, in practically all cases, the prices were correspondingly lower than those paid for the same material in 1929.

Little Change in Castings

Prices paid for locomotive brake shoes, ranging from $57 to $62 a ton, and for freight brake shoes, ranging from $32 to $45 a ton, represented reductions of $1 a ton to all railroads from the prices paid in January, and general reductions of $2 a ton from the 1929 prices. Eight of the 12 roads paid the same prices all year for grey iron castings as in 1929, but toward the close of the year one road secured a reduction of $5 a ton. December prices ranged from $3 per 100 lb. to $5 on all the roads studied. In most cases, the same price was paid throughout the year for malleable castings as in 1929, but six roads bought this commodity for 75 cents per 100 lb. less last fall than last spring. The closing prices on 14 roads ranged from $5.23 to $9.90 per 100 lb. Seven of 14 roads bought steel car castings at lower prices last fall than last spring, and last quarter prices, ranging from $4.80 to $10.30 per 100 lb., showed reductions of from 75 cents to 90 cents per 100 lb. from the 1929 prices.

Couplers and Axles

In the case of couplers, for which roads paid from $31.55 to $46.20 a pair last fall, all roads showed reductions of from 75 cents to $1 a pair and corresponding reductions from prices paid in 1929. The prices paid for pipe ranged from 4 cents to 10 cents per ft. last year, some roads paying a little more and others as much as a cent per foot less than in 1929. All roads secured reductions of from 35 to 50 cents in the price of wire nails, and the closing prices, ranging from $1.90 to $2.35 per 100 lb., showed reductions of 35 to 60 cents from 1929 prices.

There was little change in the prices of locomotive and car axles during the year. Closing prices paid for locomotive axles ranged from $2.95 to $5.50 per 100 lb., and car axles from $2.75 to $3 per 100 lb., excepting

alloy items. No change occurred in the prices paid for locomotive tires from those paid in 1929, the cost to 14 railroads ranging from $5.60 to $6.70 per 100 lb.

Greatly reduced operations in the steel mills last year profoundly reduced the value of scrap iron, notwithstanding the reduction in the amount of scrap produced by the railroads, whose sales, by reason of their volume, are always important in establishing market values. In practically all sections, scrap iron was sold for less in January than in the preceding year and the prices continued to decline precipitously throughout the year. The price of No. 1 railroad wrought, ranging from $6.90 to $11.51 a ton on six roads last fall, reflected reductions of from $1.50 to $3.50 per ton from first-quarter prices. No. 1 melting steel, sold for from $7 to $11 a ton on 11 roads last fall, represented reductions of from 50 cents to $3 a ton. Rails for re-rolling, ranging from $8.40 to $13.15 on 8 roads reporting, represented a corresponding reduction. Altogether, scrap prices dropped at least 15 per cent during the year and the prices of some were reduced to such a level as to cause railroads in some sections to consider altering scrap-handling and classification practices substantially until higher prices prevail.

Copper and Lead Recede

The soaring price of copper was one of the spectacular events in the 1929 market. The movement of copper prices was also a feature of last year's market but in the reverse direction, the price of lake copper having dropped from 75 cents per lb. in the fall of 1929 to 10 cents per lb. in the fall of 1930, the lowest price in 30 years. The price recovered somewhat later in the year, but the year ended with copper from 25 to 50 per cent lower than the previous year's average. The movement of copper downward last year was not reflected to the full extent in the prices paid for various copper articles by the railroads, but noticeable reductions took place in such articles as bond wire, sheet copper, copper tubing and castings, journal bearings, bare wire and signal wire.

The prices paid for sheet copper, ranging from 16 cents to 26 cents per lb. on 12 roads last December, showed reductions of 6 to 10 cents per lb. from the first-quarter prices. Bond wire costs, ranging from $15.70 to $16.70 per 100 lb., reflected reductions of from $1.40 to $3 per 100 lb. Brass castings on one road were reduced from $18.03 per 100 lb. in January to $10.56 per 100 lb. in November, and journal bearing prices, ranging from $10.43 to $13.56 per 100 lb. last November on 10 roads reporting prices, showed reductions of $5 to $8.50 per 100 lb., or 25 per cent. Pig lead, ranging from $4.80 to $5.75 per 100 lb. last December on 12 roads, showed a reduction of from 75 cents to $2 per 100 lb. from the 1929 prices.

Lubricants Steady

The majority of the lubricants are purchased by the railroads under long-term contract arrangements with large refineries under conditions which promote little variation in price during any year and from one year to another, it being customary, in some cases, for a road to agree upon a standard price to be paid to all companies furnishing similar grades of oil. The prices of car oil in tank lots last December, ranging from 14 cents to 21.4 cents per gal. on 12 roads, showed a reduction of 2 cents per gal. on one road, but were comparable with 1929 prices on most of the other roads. Kerosene, ranging from 5 cents to 10.5 cents per gal. on a tank lot basis last fall, however, cost from one to three cents per gal. less on most roads than it did at the beginning of the year and during 1929.

With the exception of one road, all prices for driving box grease reported, ranging from 11.3 cents to 14.2 cents per lb. last fall, remained the same throughout the year and were within a cent a pound of the prices paid in 1929. Four of 14 roads paid from 1 to 3 cents per lb. less for colored cotton waste between October and December than at the beginning of the year, the prices ranging from 5.7 to 12 cents per lb., but most of the prices were the same as those paid in 1929.

Miscellaneous Materials

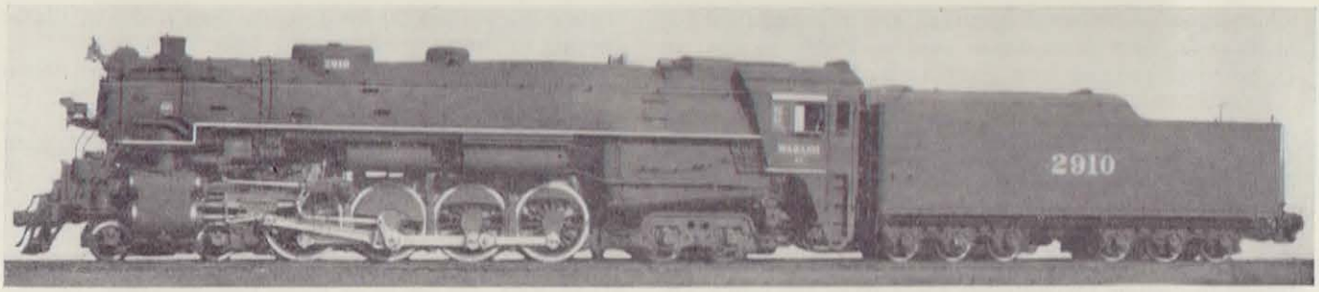
The general market price for rubber fell noticeably last year, but the railroads apparently got little benefit from this reduction, the price of sheet packing, ranging from 22 cents to 48 cents per lb. on ten roads, being uniform throughout the year, and all roads paying 45 cents per ft. last year, as well as in 1929, for air brake hose. Six roads reporting linseed oil prices, which ranged from 9.4 cents to 10.4 cents per lb. in December, secured reductions from the first-quarter prices of from 5 cents to 10 cents per lb., an average of approximately 25 per cent, and in the majority of cases, slight reductions were also obtained in the price of white lead, which ranged from $10.47 to $10.60 per lb. in December.

Oxygen

During the last quarter of 1930, four of 14 roads secured reductions of from 5 cents to 10 cents per 100 cu. ft. in the price of oxygen, but the other roads paid uniform prices, which ranged from 65 cents to $1.35 per 100 cu. ft., depending upon the nature of the respective contracts under which oxygen is usually bought. There was practically no change during the year in the price of boiler lagging, and only two roads secured substantial reductions in the price of leather belting. Six of 13 roads secured reductions of approximately three or four cents per lb. in the price of manila rope, which ranged from 14 to 19½ cents per lb. at the close of the year. Glass, ranging from $4.30 to $7.08 a box in November, reflected a reduction of from 50 cents to $1.30 from 1929 levels for half of the roads reporting purchases. Sewer pipe was bought at from 15 to 25 cents per ft. less.

Cement and Creosote

The cement market was somewhat of an exception to the general rule last year by reason of the continued demand for highway construction. While production declined toward the close of the year, prices were firm. This condition was reflected in the prices paid by 14 railroads which, ranging from $1.40 to $2.15 per bbl. during the last quarter, showed increases of 15 cents to 40 cents per bbl. over the prices paid by six roads in 1929. Other products whose prices remained firm throughout the year included creosote oil, which was bought by 10 roads at prices ranging from 9.5 to 16 cents per gal., and fire brick, the prices of which, ranging from $36 to $45.50 per M, were stationary throughout the year, with the exception of one road which obtained a reduction of $4 last fall. Soda ash, ranging in price from $1.29 to $2.47 per 100 lb., and hydrated lime, ranging in price from $8.50 to $15 per ton, throughout the year, were also in this category, with the exception of the lime purchases on two roads which showed reductions of $2 to $3 a ton from the prices paid in 1929.



Wabash 4-8-4 Type Locomotive Built by the Baldwin Locomotive Works

Locomotives Ordered in 1930

Domestic total is lowest of past nine years, while Canadian orders increase

By Walter J. Taft

Associate Editor, Railway Age

LOCOMOTIVES ordered during 1930 for domestic service in the United States totaled only 440, a number which is but 37 per cent of the 1,212 ordered in 1929 and less than three-fourths of the 603 ordered in 1928. The past year, therefore, with its orders lower than those in any of the past nine, supplants 1928 as one of the three poorest years since 1900. In only two other years of the past thirty—1919 and 1921—have fewer locomotives been purchased, the respective orders of these abnormally low years being 214 and 239.

In an article similar to this, published in the *Railway Age* of January 7, 1928, the year 1927, when 734 locomotives were ordered for domestic service was described as a period of "decidedly hesitant" buying. All that can be said of 1930, when orders totaled somewhat less than two-thirds of this 1927 figure, is that the past year was one in which railway purchases were curtailed most drastically. The explanation is found in the past year's trend of railway traffic and earnings; the depressed condition of railway business has forced railway executives into vigorous programs of retrenchment. In such a state of circumstances equipment buying, along with other railway purchasing, was no doubt held to the irreducible minimum.

It should be pointed out in connection with comparison of recent locomotive orders with those prior to 1920 that modern locomotives are far more powerful and far more costly than those of the days when yearly orders totaled thousands.

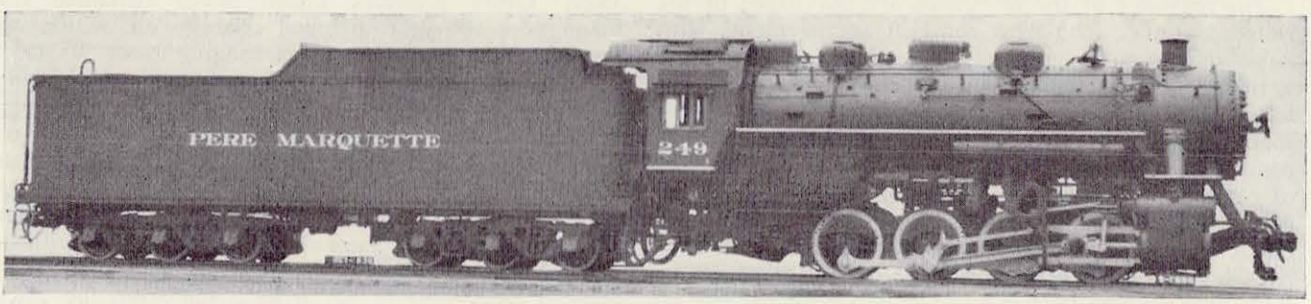
The situation in the Canadian locomotive market is somewhat brighter. During the past year Canadian roads ordered in that country 95 locomotives as compared with the 77 ordered in 1929. With the exception of 1928 when 98 were ordered this Canadian total is the largest since 1920 and has been exceeded in only three years since 1918, the year in which the segregation of Canadian from domestic orders in the accompanying table was commenced.

Locomotives ordered in the United States for export during 1930 totaled 20 or less than one-fifth of the 106 ordered for export during 1929. This 1930 export figure is the lowest reported since 1915 when compilation of these foreign orders was started. In only two others of these 16 years—1927, with its export orders for 54 locomotives and 1928 with 27—has the total been under 100.

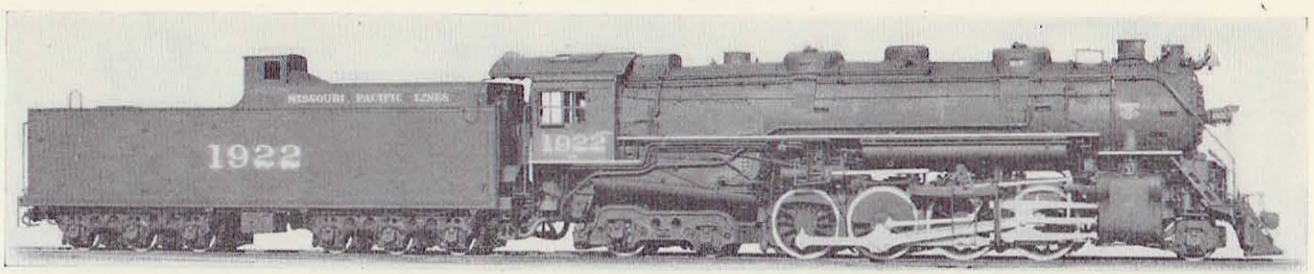
Table I—Locomotive Orders in 1930

For service in the United States	440
For service in Canada	95
For export to other countries	20
Grand total	555

Production statistics reveal that in 1930 there were 972 locomotives built in the United States for domestic



Pere Marquette 0-8-0 Type Switching Locomotive Built by the American Locomotive Company



Missouri Pacific 2-8-4 Type Locomotive Built by Lima Locomotive Works, Inc.

service. This compares with a 1929 production figure of 926. During the past year Canadian builders produced 111 locomotives as compared with 96 in 1929. This segregation of Canadian from the United States production figures, first made in the 1930 Annual Statistical Number, is continued in the accompanying tabulation, and will prevail in future issues. For comparison with years prior to the segregation, however, the United States and Canadian production figures must be combined. On this latter basis the 1930 figure becomes 1,083 and compares favorably with 1,022 in 1929, 636 in 1928 and 1,009 in 1927. Locomotives produced in the United States for export during 1930 totaled 51 as compared with 139 in 1929 and 111 in 1928; the past year's figure is the only one below 100 in the accompanying tabulation which is continuous back to 1905.

Table II—Orders for Locomotives Since 1901

Domestic Orders Only

Year	Locomotives	Year	Locomotives
1901	4,340	1908	1,182
1902	4,665	1909	3,350
1903	3,283	1910	3,787
1904	2,538	1911	2,850
1905	6,265	1912	4,515
1906	5,642	1913	3,467
1907	3,482	1914	1,265

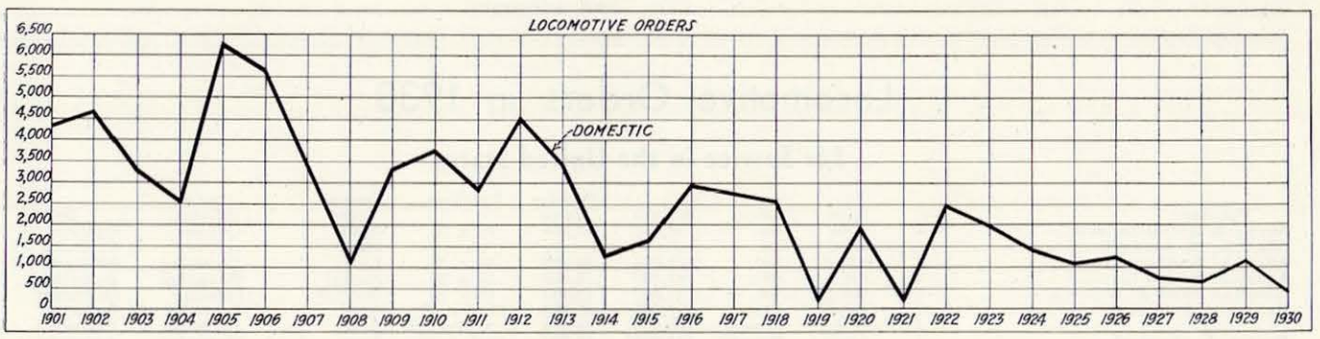
Domestic and Foreign

Year	Domestic	Canadian	Export	Total
1915	1,612	...	850	2,462
1916	2,910	...	2,983	5,893
1917	2,704	...	3,438	6,142
1918	2,593	209	2,086	4,888
1919	214	58	898	1,170
1920	1,998	189	718	2,905
1921	239	35	546	820
1922	2,600	68	131	2,799
1923	1,944	82	116	2,142
1924	1,413	71	142	1,626
1925	1,055	10	209	1,274
1926	1,301	61	180	1,542
1927	734	58	54	846
1928	603	98	27	728
1929	1,212	77	106	1,395
1930	440	95	20	555

Prior to 1918, Canadian orders included under "Domestic."

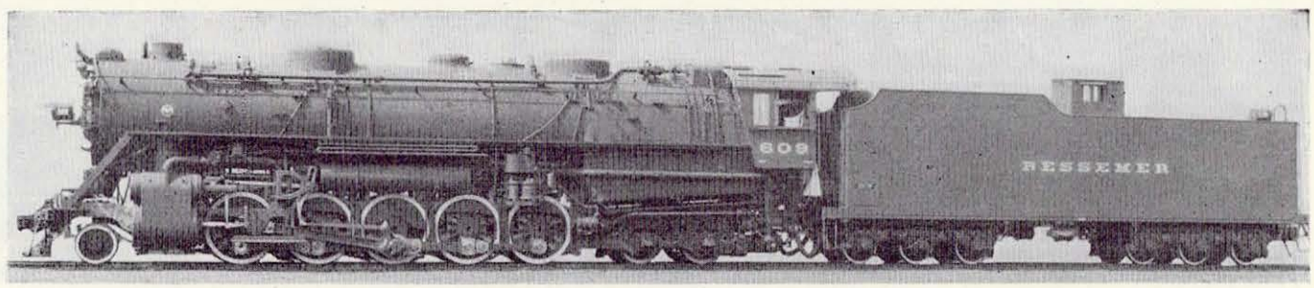
The distinction between locomotives ordered and the number built should be emphasized. A locomotive is under construction for several months and thus locomotive production figures for any year naturally include some units which were ordered during the closing months of the year previous to that under review. It is this overlap from year to year that results in the presentation of a total production figure different from the total ordered.

The Car Service Division of the American Railway Association reports monthly totals of locomotive installations and retirements. These figures will not agree with the *Railway Age* totals of locomotives ordered or built. This follows because the Car Service Division total covers only Class I carriers, whereas the *Railway Age* figures cover all carriers, and also because the Car Service Division's report, includes, under installation, locomotives leased from other roads or rebuilt locomotives.



Locomotive Orders from 1901 to 1930

The Van Sweringen lines were the buyers of the



Bessemer & Lake Erie 2-10-4 Type Locomotive Built by The Baldwin Locomotive Works

Chicago, St. Paul, Minneapolis & Omaha 4-6-2 Type Locomotive Built by the American Locomotive Company

largest number of locomotives during 1930, their combined purchases totaling 130. Of this total the Chesapeake & Ohio ordered 105, the Pere Marquette, 15, and the Erie, 10. Other large purchases were made by the New York Central, which ordered 65 (30 for service on the New York Central, 10 for the Cleveland, Cincinnati, Chicago & St. Louis and 25 for the Boston & Albany), and the Union Pacific System, which ordered 15 for the Oregon Short Line and 10 for the Union Pacific. The Chicago Great Western ordered 21 locomotives during the year while the New York, New Haven & Hartford purchased 10 electric locomotives.

In the appended list of locomotive orders some few omissions of small orders doubtless occur. The details presented were supplied by railways and other purchasers of locomotives in response to inquiries from the *Railway Age*. They were checked against similar lists furnished through the co-operation of the builders, and amplified by reference to the weekly reports in the Equipment and Supplies column of the *Railway Age*. Because of the short time available for the compilation and the haste necessary to insure publication so soon after the end of the year, the *Railway Age* does not desire to make any claims as to the scientifically statistical accuracy of the tables or totals drawn from them. However, the real purpose of the statistics is to allow comparisons of the year's business with that of other years, which purpose it is hoped they meet with entire adequacy.

Table III—Locomotives Built in 1930

	United States	Canada	Total
Domestic	972	111	1,083
Foreign	51	..	51
Total	1,023	111	1,134

Comparison with Previous Years

Year	Domestic	Foreign	Total	Year	Domestic	Foreign	Total
1896	866	309	1,176	1912†	4,403	512	4,915
1897	865	386	1,251	1913†	4,561	771	5,332
1898	1,321	554	1,875	1914†	1,962	273	2,235
1899	1,951	514	2,475	1915†	1,250	835	2,035
1900	2,648	505	3,153	1916†	2,708	1,367	4,075
1901	....	....	3,384	1917†	2,585	2,861	5,446
1902	....	....	4,070	1918†	3,668	2,807	6,475
1903	....	....	5,152	1919†	2,162	1,110	3,272
1904	....	....	3,441	1920†	2,022	1,650	3,672
1905*	4,896	595	5,491	1921†	1,185	638	1,823
1906*	6,232	720	6,952	1922†	1,303	231	1,534
1907*	6,564	798	7,362	1923†	3,505	280	3,795
1908*	1,886	456	2,342	1924†	1,810	226	2,036
1909*	2,596	291	2,887	1925†	994	291	1,285
1910*	4,441	314	4,755	1926†	1,585	185	1,770
1911*	3,143	387	3,530	1927†	1,009	167	1,176
				1928†	636	111	747

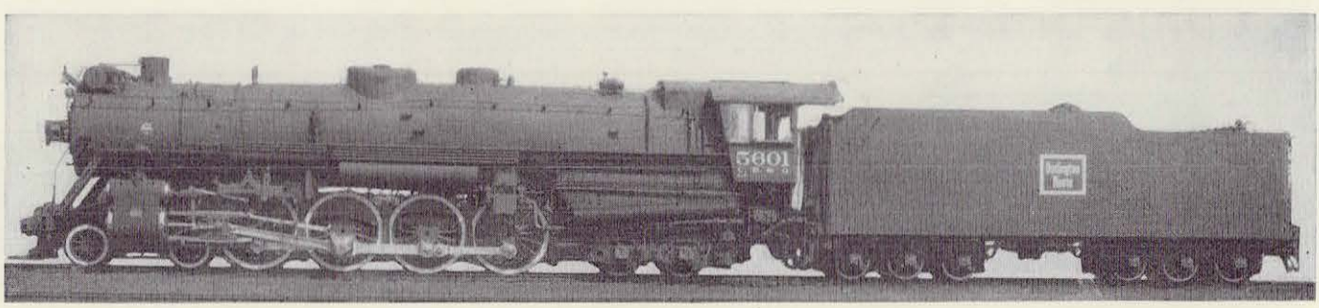
* Includes Canadian output.
† Includes Canadian output and equipment built in railroad shops.

	United States			Canada			Grand
	Domestic	Foreign	Total	Domestic	Foreign	Total	total
1929	926	139	1,065	96	....	96	1,161
1930	972	51	1,023	111	....	111	1,134

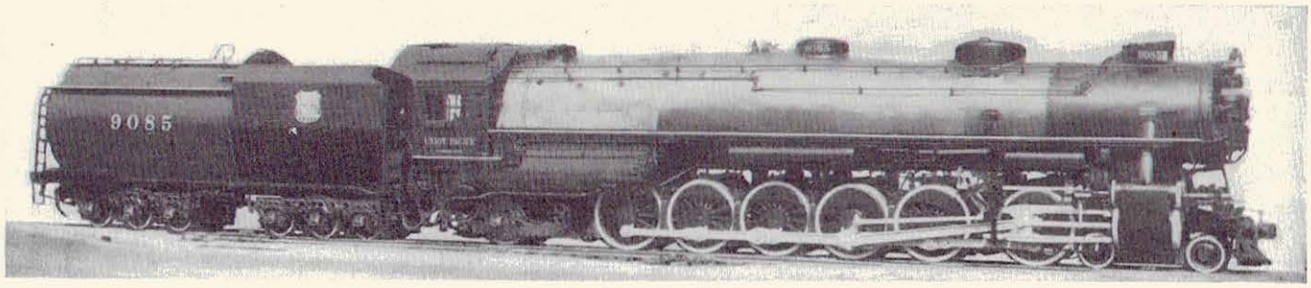
Locomotive Orders in 1930

For Service in the United States

Purchaser	No.	Type	Service	Weight	Tractive force	Cylinders	Date of order	Date of delivery	Builder
Akron & Barberton Belt	4	0-6-0	Sw.	198,380	47,200	22 x 28	April	October	Baldwin
Aliquippa & Southern	2	0-8-0	Sw.	.....	.....	.....	May	.....	American
Alton & Southern	1	0-10-0	Sw.	324,000	80,500	28 x 30	June	December	Baldwin
American Bridge Co.	1	0-6-0	Sw.	142,000	28,000	19 x 24	August	November	Baldwin
American Steel & Wire Co.	1	0-4-0	Sw.	52,000	12,400	13 x 16	Dec. '29	February	Davenport
Baltimore & Ohio	2	4-8-2	Pass.	391,000	65,000	27½ x 30	April	December	Baldwin
	2	2-6-6-2	Freight	460,000	90,000	23 x 30-4 cyl.	April	December	Baldwin
Bangor & Aroostook	3	4-8-2	Freight	312,000	60,200	22½ x 30	June	November	American
Bessemer & Lake Erie	7	2-10-4	Freight	503,290	109,935	31 x 32	January	April	Baldwin
	2	2-10-4	Freight	506,970	109,935	31 x 32	January	May	Baldwin
Boston & Albany	5	4-6-4	Pass.	356,500	55,320	25 x 28	February	August	American
	10	2-8-4	Freight	396,100	81,400	28 x 30	February	August	Lima
	10	4-6-4	Pass.	355,200	55,400	.....	December	1931	Lima
Brown Co.	1	2-6-2	Sw.	168,100	31,000	19 x 24	March	July	Baldwin
Central of New Jersey	5	0-8-0	Sw.	264,600	64,093	24 x 30	March	Sept.-Oct.	Baldwin
	5	4-6-2	Pass.	333,800	52,180	26 x 28	March	October	Baldwin



Chicago, Burlington & Quincy 4-8-4 Type Locomotive Built by The Baldwin Locomotive Works

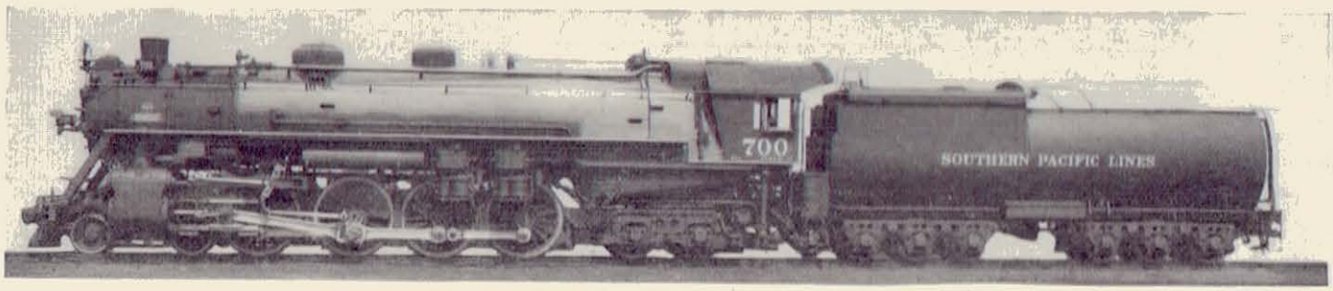


Union Pacific 3-Cylinder Locomotive, 4-12-2 Type, Built by the American Locomotive Company

Purchaser	No.	Type	Service	Weight	Tractive force	Cylinders	Date of order	Date of delivery	Builder
Chesapeake & Ohio	40	2-10-4	Freight	566,000	106,584	29 x 34	January	November	Lima
	65	0-8-0	Sw.	240,000	57,200	25 x 28	January	October	American
	*40	Tenders	.....	.....	.....	.....	January	1930	American
Chicago & Illinois Midland	2	2-10-2	Freight	400,000	85,300	30 x 32	November	.....	Lima
Chicago Great Western	15	2-10-4	Freight	460,200	97,900	29 x 32	August	Jan. '31	Baldwin
	6	2-10-4	Freight	460,200	97,900	29 x 32	October	December	Lima
Chicago, St. P., Minn. & Omaha	3	4-6-2	Pass.	340,000	64,600	25 x 28	April	October	American
Clapp, Riley & Hall	1	0-4-0	Sw.	42,000	9,650	11 x 16	May	May	Davenport
Cleveland, Cinn., Chi. & St. L.	10	4-6-4	Pass.	.....	.....	.....	December	1931	American
Consumers Power Co.	3	0-4-0	Sw.	65,000	12,950	13 x 18	March	March	Davenport
Coos Bay Lumber Co.	2	2-8-2	Freight	170,000	.....	20 x 24	January	May	American
Cornwall	1	0-6-0	Sw.	182,000	43,200	23 x 28	February	June	Baldwin
Defiance Coal Co.	1	0-4-0	Sw.	42,000	9,650	11 x 16	May	May	Davenport
Delaware & Hudson	2	2-8-0	Freight	298,000	68,500	25 x 32	.....	March-June	Company Shops
Denver & Rio Grande Western	10	2-8-8-2	Freight	738,800	131,800	26 x 32	Dec. '29	May	American
Durham & Southern	2	2-10-0	Freight	212,000	46,512	24 x 28	March	June	Baldwin
Electro Metallurgical Co.	1	0-6-0	Sw.	167,000	35,000	21 x 26	June	August	Baldwin
Elgin, Joliet & Eastern	8	2-8-2	Freight	332,460	58,800	28 x 30	March	August	Baldwin
Erie	10	0-8-0	Sw.	236,280	57,200	25 x 28	June	Nov.-Dec.	Baldwin
	*5	Tenders	.....	.....	.....	.....	April	.....	Baldwin
Ferguson Co., J. D.	1	0-4-0	Sw.	42,000	9,650	11 x 16	February	March	Davenport
	1	0-4-0	Sw.	50,000	10,400	12 x 16	February	February	Davenport
Galesburg Mining Co.	1	0-4-0	Sw.	42,000	9,650	11 x 16	October	October	Davenport
General American Tank Car	2	0-6-0	Sw.	107,000	.....	18 x 24	April	August	American
General Steel Castings Corp.	1	0-6-0	Sw.	160,000	37,750	22 x 26	January	March	Baldwin
Georgia, Ashburn, Sylvester & Camilla	1	2-8-2	Freight	178,740	30,700	19 x 26	January	April	Baldwin
Greenville Crushed Rock Co.	1	0-4-0	Sw.	42,000	9,650	11 x 16	April	April	Davenport
Hawkeye Portland Cement Co.	1	0-4-0	Sw.	50,000	10,400	12 x 16	May	May	Davenport
Humboldt Gravel Co.	1	0-4-0	Sw.	42,000	9,650	11 x 16	May	May	Davenport
Illinois Steel Co.	4	0-4-0	Sw.	120,000	.....	18 x 20	August	.....	American
Indianapolis Union	4	0-8-0	Sw.	220,800	51,040	25 x 28	April	October	Baldwin
Lamm Lumber Co.	1	2-8-2	Logging	156,000	31,900	19 x 24	February	June	Baldwin
Lehigh & New England	2	2-10-0	Freight	399,200	90,300	30 x 32	September	December	Baldwin
	3	0-8-0	Sw.	269,800	68,500	27 x 30	September	December	Baldwin
Lehigh Valley	1	4-8-4	Freight	425,000	66,400	27 x 30	July	Jan. '31	Baldwin
	1	4-8-4	Freight	426,000	66,700	26 x 32	July	Jan. '31	American
Lihue Plantation	1	0-6-2	Freight	51,000	8,200	11 x 16	May	August	Baldwin
Litchfield & Madison	2	2-8-2	Freight	274,000	55,000	25 x 30	October	Feb. '31	American
Louisville & Nashville	6	4-8-2	Pass.	334,240	53,550	27 x 30	March	December	Baldwin
Maine Central	2	4-6-4	Pass.	312,590	41,300	23 x 28	March	June	Baldwin
Michigan Limestone & Chemical Co.	2	0-6-0	Sw.	157,000	35,300	21 x 26	February	April	Baldwin
New York Central	30	4-6-4	Pass.	.....	.....	.....	December	1931	American
New York, New Haven & Hartford	*6	Tenders	.....	.....	.....	.....	February	August	American
Norfolk & Western	10	2-8-8-2	Freight	582,990	118,386	25 & 39 x 32	August	Feb.-Nov. '31	Company Shops
Olaa Sugar Co.	1	0-4-2	Freight	33,500	4,220	8½ x 12	May	August	Baldwin
Oregon Short Line	15	4-12-2	Freight	515,000	96,650	27x31 & 32-3 cyl.	February	July-Aug.	American
Peoria & Pekin Union	2	0-8-0	Sw.	223,900	51,040	25 x 28	May	November	Baldwin
Pere Marquette	15	0-8-0	Sw.	240,000	57,200	25 x 28	January	Oct.-Nov.	American
	*15	Tenders	.....	.....	.....	.....	January	1930	Lima
Pickands Mather & Co.	1	0-6-0	Sw.	182,000	.....	22 x 28	August	December	American
Reading	10	2-10-2	Freight	457,000	90,500	30½ x 32	December	Apr.-May '31	Baldwin
	*10	Tenders	.....	.....	.....	.....	July	.....	Baldwin
St. Louis Southwestern	10	4-8-4	Freight	425,000	61,500	26 x 30	January	October	Baldwin
Seaboard Air Line	8	2-10-0	Freight	.....	.....	.....	Dec. '29	March	Baldwin
Stone & Webster Eng. Corp.	1	0-4-0	Sw.	99,000	22,400	16 x 24	March	March	Baldwin
Terminal Ry., Ala. State Docks	1	0-6-0	Sw.	164,000	41,200	21 x 28	March	July	American
Texas Company	1	0-6-0	Sw.	144,300	35,000	21 x 26	June	October	Baldwin
Union Pacific	10	4-12-2	Freight	515,000	96,650	27 x 31 & 32-3cyl.	February	July-Aug.	American
	*20	Tenders	.....	.....	.....	.....	March	.....	American
Union Shipbuilding Co.	1	0-4-0	Sw.	99,000	22,400	16 x 24	February	February	Baldwin
Weirton Steel Co.	1	0-8-0	Sw.	240,000	55,600	25 x 30	May	September	American
West River	1	2-8-0	.....	120,000	.....	18 x 24	October	December	American
Weyerhaeuser Timber Co.	1	2-6-6-2	Logging	245,700	44,800	16 x 24	February	May	Baldwin

* Not included in totals.

Kentucky & Indiana Terminal 0-6-0 Type Switching Locomotive Built by Lima Locomotive Works, Inc.



Southern Pacific 4-8-4 Type Locomotive Built by The Baldwin Locomotive Works

Export

Purchaser	No.	Type	Service	Weight	Tractive force	Cylinders	Date of order	Date of delivery	Builder
Amer. Smelting & Ref. Co.	1	4-6-0	.....	.....	.....	.....	January	.....	Baldwin
Cerro de Pasco	2	0-4-0	Sw.	42,000	9,650	11 x 16	January	February	American
Eastern Prov. Cement Co., Ltd.	1	4-6-2	Freight	66,000	12,350	13½ x 18	January	March	Davenport
Equitable Equipment Co.	1	2-8-0	.....	.....	.....	.....	March	.....	Baldwin
International Rys. of Cent. Am.	3	2-8-2	Freight	141,000	.....	18 x 22	January	June-July	Porter
Newfoundland	2	2-8-2	Pass.-Frt.	146,000	27,600	18 x 24	May	September	American
North Natal Nav. Collieries, Ltd.	1	2-10-2	Freight	195,000	36,800	19 x 24	August	December	Baldwin
South Af. Iron & Steel Ind. Corp.	1	4-8-2	Freight	168,100	27,400	18 x 22	May	July	Baldwin

Canada

Purchaser	No.	Type	Service	Weight	Tractive force	Cylinders	Date of order	Date of delivery	Builder
Beauharnois L., H., & P. Co.	14	0-4-0	Sw.	86,500	17,000	15 x 22	January	Mar.-Apr.	Canadian
Canadian Car & Foundry Co.	1	0-6-0	Sw.	124,700	28,720	19 x 26	Dec. '29	March	Canadian
Canadian National	5	4-6-4	Pass.	356,400	43,300	23 x 28	Dec. '29	September	Montreal
	1	2-8-2	Freight	337,200	56,200	24 x 30	1929	September	Company Shops
	10	0-8-0	Sw.	217,000	50,000	22 x 28	April	October	Company Shops
	12	0-8-0	Sw.	217,000	50,000	22 x 28	April	September	Company Shops
	3	0-8-0	Sw.	217,000	50,000	22 x 28	April	Jan. '31	Company Shops
	11	2-8-0	Freight	.....	.....	20 x 30	November	1931	Company Shops
	10	2-8-0	Freight	.....	.....	20 x 30	November	1931	Company Shops
Canadian Pacific	10	4-6-4	Pass.	350,900	45,200	22 x 30	June	Nov.-Jan. '31	Montreal
	13	0-8-0	Sw.	250,000	59,350	22½ x 32	June	Jan. '31	Canadian
	*10	Tenders	.....	.....	.....	.....	March	June	Montreal
	*10	Tenders	.....	.....	.....	.....	June	August	Montreal
Electro Metallurgical Co. of Can.	1	.....	.....	100,000	.....	16 x 24	May	.....	Montreal
Northern Alberta	2	2-10-0	Freight	229,750	49,000	24 x 28	March	August	Canadian
Quebec Central	1	4-6-2	Pass.	219,000	31,000	22½ x 28	March	June	Company Shops
Temiskaming & Northern Ontario	4	4-8-0	Freight	238,250	45,000	23 x 30	April	October	Canadian

* Not included in totals.

Oil-Electric, Gas-Electric or Gasoline Locomotives

For Service in the United States

Purchaser	No.	Wheel arrangement	Service	Type	Weight	Horse-power	Date of order	Date of delivery	Builder
American Rolling Mills	1	0-4-4-0	Sw.	Oil-Elect.	156,400	300	March	November	Baldwin-West.
American Steel & Wire Co.	1	0-4-4-0	Sw.	Oil-Elect.	140,000	400	February	August	Baldwin-West.
Chicago & North Western	1	0-4-4-0	Sw.	Oil-Elect.	214,000	600	June	August	Ingersoll R.-G. E.
Chicago, Burlington & Quincy	1	0-4-4-0	Sw.	Gas-Elect.	90,000	336	June	October	Porter-West.
Chicago, Rock Island & Pacific	1	0-4-4-0	Sw.	Oil-El.-Bat.	257,000	1,665	January	June	Am.-I.R.-G.E.-El. St. Bat.
Consumers Power Co.	1	0-4-0	Sw.	Gas-Elect.	50,000	165	January	March	Dav.-G. E.-Buda
Dewey Portland Cem. Co.	1	0-4-4-0	Sw.	Gas.-Elect.	60,000	230	March	April	Dav.-G. E.-Buda
Differential Steel Car	1	0-4-4-0	Sw.	Gas-Elect.	90,000	310	May	December	Co. Shops-West.
Fate-Root-Heath Loco. Wks.	1	0-4-0	Sw.	Oil-Elect.	70,000	180	September	1931	Co. Shops-West
	1	0-4-4-0	Sw.	Gas-Elect.	90,000	330	May	December	Co. Shops-West.
Illinois Steel Co.	1	0-4-4-0	Sw.	Oil-Elect.	120,000	300	August	Jan. '31	Baldwin-West.
Inland Steel Co.	1	0-4-4-0	Sw.	Oil-Elect.	220,000	800	July	September	Baldwin-West.
Johnson Co.	1	0-4-4-0	Sw.	Gas-Elect.	24,000	120	February	May	Vulcan-West.
Manufacturers Railway	1	0-4-4-0	Sw.	Oil-Elect.	230,000	1,000	October	Aug. '31	G. E.-Busch-Sulzer
New York Central	2	0-4-4-0	Sw.	Oil-El.-Bat.	254,300	1,665	Dec. '29	June	Am.-I.R.-G.E.-El. St. Bat.
Porter Co., H. K.	1	0-4-4-0	Sw.	Gas-Elect.	90,000	330	November	1931	Co. Shops-West.
U. S. Army (Ordnance Dept.)	1	0-4-0	Sw.	Gas.-Elect.	60,000	175	February	October	F.-R.-H.-West.
U. S. Navy	1	0-4-0	Sw.	Gas-Elect.	60,000	175	November	1931	Vulcan-West.
Westinghouse E. & M. Co.	1	0-4-4-0	Sw.	Oil-Elect.	120,000	400	August	Feb. '31	Baldwin-Co. Shops

Export

Purchaser	No.	Wheel arrangement	Service	Type	Weight	Horse-power	Date of order	Date of delivery	Builder
Anglo-Chilean Cons. Nitrate Corp.	4	.....	.....	Oil-Elect.	.....	250	May	August	Elec.-M.-G.E.-Winton

Canada

Purchaser	No.	Wheel arrangement	Service	Type	Weight	Horse-power	Date of order	Date of delivery	Builder
Canadian National	1	0-4-4-0	Sw.	Gas-Elect.	60,000	250	November	1931	Whitcomb-West.

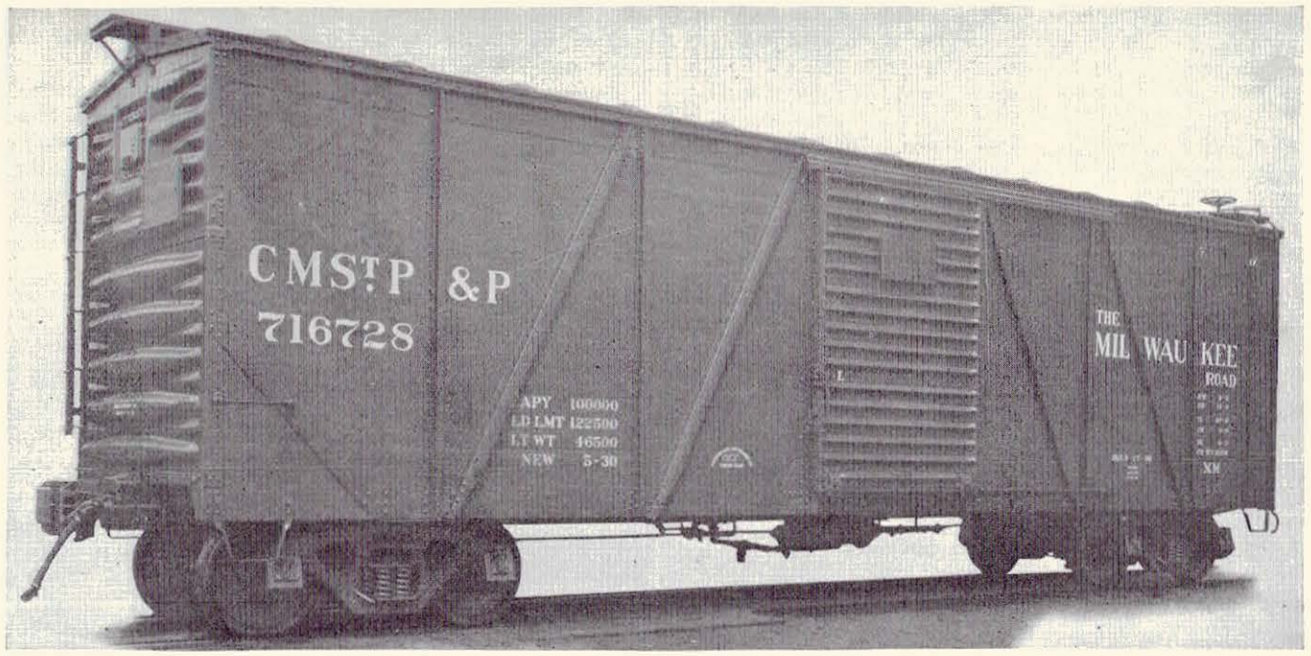
Electric Locomotives

For Service in the United States

Purchaser	No.	Wheel arrangement	Service	Weight	Horse-power	Date of order	Date of delivery	Builder
Chicago, S. S. & South Bend	1	0-4-4-0	Sw.	170,000	1,445	June	November	General Electric
New York, New Haven & Hartford	10	4-6-0+0-6-4	Pass.	400,000	3,430	August	Aug. '31	General Electric
Pennsylvania	2	4-4-4	Pass.	300,000	2,500	April	Feb. '31	Co. Shops-West.-G.E.
	2	4-6-4	Pass.	375,000	3,750	April	Mar. '31	Co. Shops-West.-G.E.
	2	2-8-2	Freight	330,000	2,500	April	.....	Co. Shops-West.-G.E.
Salem Terminal Corp.	1	0-4-4-0	Sw.	100,000	308	January	January	General Electric
Salt Lake & Utah	1	.....	.....	120,000	720	July	.....	Baldwin-West.

Export

Purchaser	No.	Wheel arrangement	Service	Weight	Horse-power	Date of order	Date of delivery	Builder
Chilean State Rys.	4	2-6-0+0-6-2	Pass.	260,000	2,460	May	December	Baldwin-West



Chicago, Milwaukee, St. Paul & Pacific 50-Ton Single-Sheathed Box Car Built by American Car & Foundry Company

Freight Cars Ordered in 1930

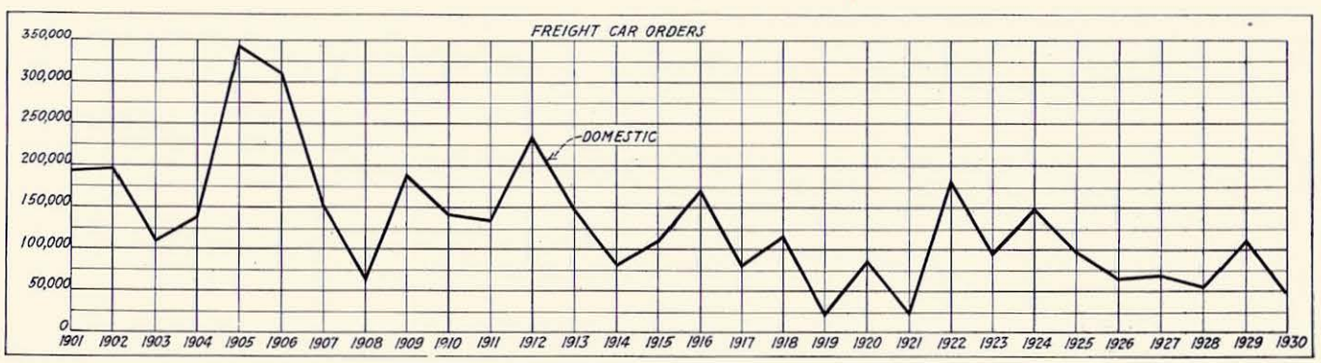
Total, less than half that of 1929, is one of the three lowest in past 30 years

By F. W. Kraeger

Associate Editor, Railway Age

FREIGHT cars ordered during 1930 for service in the United States reached the lowest total since 1921 and with the exception of that year and 1919 the past year's figure of 46,360 cars is the lowest in three decades. It is less than half the 111,218 freight cars ordered during 1929 and about 5,000 under the 1928 figure of 51,200, which was regarded as disappointing. In no other year since 1900 save for the abnormally low years of 1919 and 1921, have orders for less than 50,000 freight cars been placed. In 1919 the figure was 22,062, rising to 84,207 in 1920, only to fall again to 23,346 in 1921.

Manifesting the same downward tendency, Canadian freight car orders, placed in that country by Canadian railways, fell in 1930 to 1,936 from a 1929 figure of 9,899. This 1930 figure of Canadian orders is one of the six lowest Canadian totals of the past 13 years. In this latter period fewer freight cars were purchased in Canada only in 1921, 1922, 1924, 1925 and 1926. In 1927 Canadian orders involved the purchase of 2,133 freight



Freight Car Orders from 1901 to 1930

cars while in 1928 there were a total of 8,901 ordered.

Finally, the decline prevailed also among freight cars ordered in the United States for export; the 1930 total of 1,200 compares with 3,023 ordered for export during 1929 and 2,530 in 1928.

Production totals were also lower. In 1930, 75,188 freight cars were built for service in the United States as against a comparable 1929 figure of 82,240. The number of freight cars produced last year did not, however, reach such a relatively low point as did the orders. While these 1930 domestic production figures, as pointed out, are lower than those of 1929 they are nevertheless above 1927 and 1928. In Canada there were produced in 1930 a total of 6,923 freight cars as compared with 8,557 in 1929 and 5,158 in 1928. Production in the United States for export during 1930 involved the building of 1,909 freight cars as against a 1929 figure of 3,168 and 938 in 1928.

The foregoing production figures should not be confused with the totals of orders placed. Nor should this total number of cars built be compared with the installation of cars, reported in the statistics issued monthly by the Car Service Division of the American Railway Association, since that report includes only installations on Class I roads, whereas *Railway Age* figures include the production of all cars for the railroads as well as private car lines. Furthermore, the *Railway Age* totals include only new cars or those having new bodies, while

Table I—Freight Car Orders in 1930

For service in the United States	46,360
For service in Canada	1,936
For export to other countries	1,200
Grand total	49,496

Table II—Orders for Freight Cars Since 1901

Year	Domestic Orders: Freight cars	Year	Freight cars
1901	193,439	1908	62,669
1902	195,248	1909	189,360
1903	108,936	1910	141,024
1904	136,561	1911	133,117
1905	341,315	1912	234,758
1906	310,315	1913	146,732
1907	151,711	1914	80,264

Year	Domestic and Foreign: Domestic	Canadian	Export	Total
1915	109,792	.....	18,222	128,014
1916	170,054	.....	35,314	205,368
1917	79,367	.....	53,191	132,558
1918	114,113	9,657	53,547	177,317
1919	22,062	3,837	3,994	29,893
1920	84,207	12,406	9,056	105,669
1921	23,346	30	4,982	28,358
1922	180,154	746	1,072	181,972
1923	94,471	8,685	396	103,552
1924	143,728	1,867	4,017	149,612
1925	92,816	642	2,138	95,596
1926	67,029	1,495	1,971	70,495
1927	72,006	2,133	646	74,785
1928	51,200	8,901	2,530	62,631
1929	111,218	9,899	3,023	124,140
1930	46,360	1,936	1,200	49,496

Prior to 1918, Canadian orders included in domestic.

Table III—Freight Cars Built in 1930

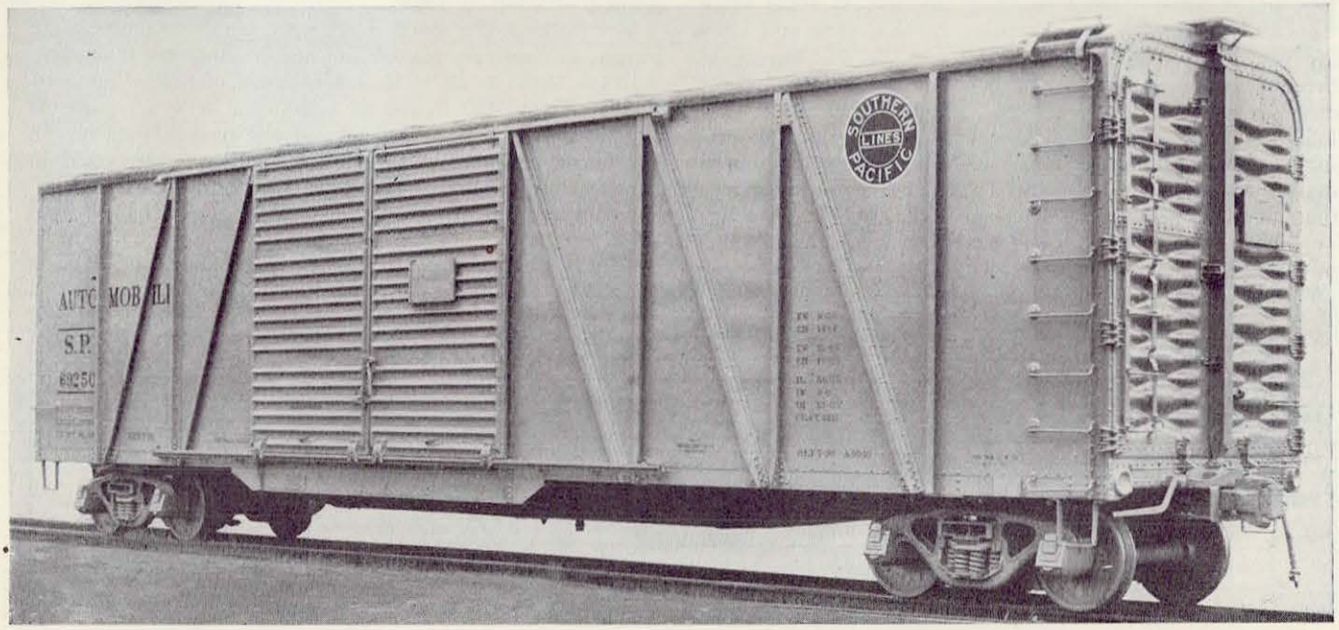
	United States	Canada	Total
Domestic	75,188	6,923	82,111
Foreign	1,909	....	1,909
Total	77,097	6,923	84,020

Comparison with Previous Years

Year	Domestic	Foreign	Total
1899	117,982	1,904	119,886
1900	113,070	2,561	115,631
1901	132,591	4,359	136,950
1902	161,747	2,800	162,599
1903	153,195	1,613	152,801
1904	60,955	1,995	60,806
1905*	162,701	5,305	165,155
1906*	236,451	7,219	240,503
1907*	280,216	9,429	284,188
1908*	75,344	1,211	76,555
1909*	91,077	2,493	93,570
1910*	176,374	4,571	180,945
1911*	68,961	3,200	72,161
1912†	148,357	4,072	152,429

* Includes Canadian output.
† Includes Canadian output and equipment built in company shops.

Year	United States: Domestic	Foreign	Total	Canadian: Domestic	Foreign	Total	Grand total
1913	176,049	9,618	185,667	22,017	....	22,017	207,684
1914	97,626	462	98,088	6,453	....	6,453	104,451
1915	58,226	11,916	70,142	1,758	2,212	3,970	74,112
1916	111,516	17,905	129,421	....	....	5,580	135,001
1917	115,705	23,938	139,643	3,658	8,100	11,758	151,401
1918	67,063	40,981	108,044	14,704	1,960	16,664	124,708
1919	94,981	61,783	156,764	6,391	30	6,421	163,185
1920	60,955	14,480	75,435	....	....	....	....
1921	40,292	6,412	46,704	8,404	745	9,149	55,853
1922	66,289	1,126	67,415	458	100	558	67,973
1923	175,748	2,418	178,166	....	....	....	....
1924	113,761	1,141	114,902	1,721	....	1,721	116,623
1925	105,935	3,010	108,945	....	....	....	....
1926	88,862	2,771	91,633	1,645	....	1,645	93,278
1927	63,390	1,087	64,477	2,851	....	2,851	67,328
1928	46,060	938	46,998	5,158	....	5,158	52,156
1929	82,240	3,168	85,408	8,557	....	8,557	93,965
1930	75,188	1,909	77,097	6,923	....	6,923	84,020



Southern Pacific Single-Sheathed All-Steel Automobile Box Car Built by Pressed Steel Car Company

Baltimore & Ohio 70-Ton, 65-ft. Mill Type Gondola Car with Duryea Cushion Underframe— Built by Bethlehem Steel Company

the Car Service Division figures include leased cars, and in prior years, have included rebuilt cars.

In attempting to discuss the abnormally low number of freight cars ordered during 1930 one must turn for an explanation to the business depression and its effect on railway traffic and earnings. The traffic decline, commencing in October, 1929, has continued unarrested throughout 1930 until carloadings have reached their lowest totals since 1922. Likewise railway earnings have declined sharply and thus a drastic curtailment of equipment purchases was not an unexpected development.

In the forefront among 1930 freight car buyers were the Van Sweringen lines. These roads purchased 13,754 cars or more than one-quarter of the year's total. Of the 13,754, the Chesapeake & Ohio ordered 6,504, the Pere Marquette, 4,875 and the Erie, 2,375. Other large purchasers were: Chicago, Milwaukee, St. Paul & Pacific, 2,812; Baltimore & Ohio, 2,002 and Seaboard Air Line, 2,000. Of the Canadian cars ordered, the Canadian National purchased 781 and the Canadian Pacific 1,155.

The following two explanatory paragraphs, because they apply as well to the current review, are reprinted from the 1929 Annual Statistical Number:

"The appended tables contain a detailed statement of orders placed for new freight cars with builders during 1930 by railroads and industrial concerns; also those placed in Canada and for export. The list of orders was compiled from information furnished to the *Railway Age* by the railroads, private car lines, and other purchasers of cars, in response to requests. The data thus furnished were then checked against lists of orders supplied by the car builders, and amplified accordingly, and also against the weekly reports of orders appearing in the Equipment and Supplies column of the *Railway Age*. The production figures were secured in response to requests to the car builders for this information. As in former years the *Railway Age* is especially indebted to the American Railway Car Institute in securing the reports of the companies affiliated with that organization.

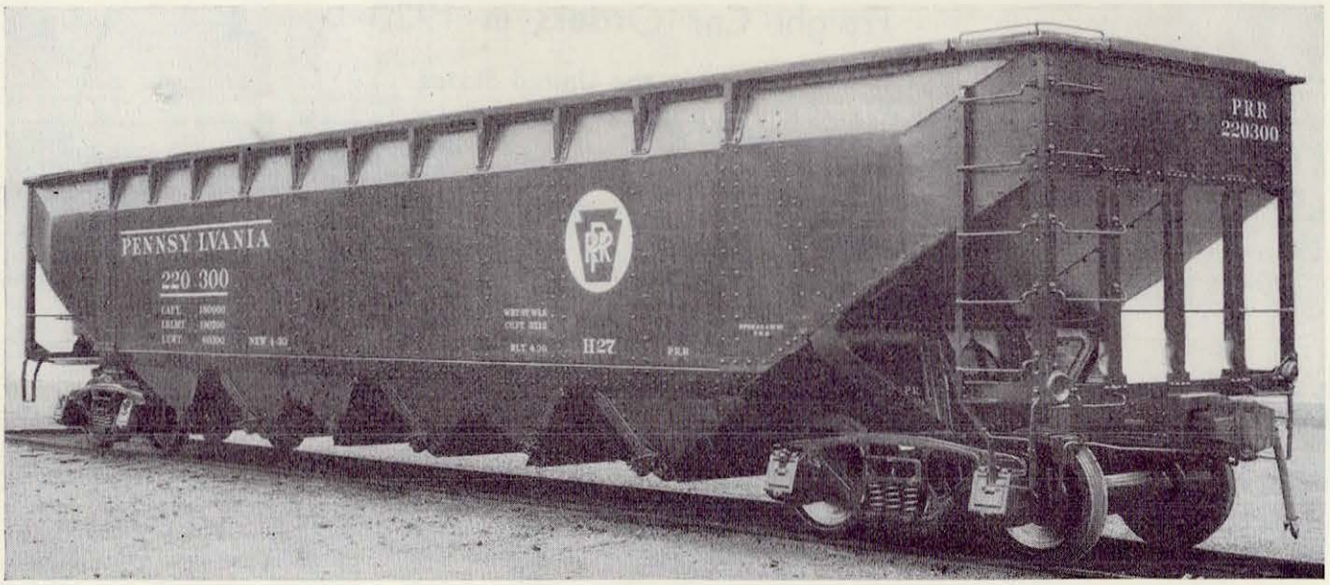
"The *Railway Age* is not sufficiently optimistic to believe that the lists can include all the orders placed or that the figures of production are of scientific accuracy. It feels that such accuracy would be next to impossible, in view of the short space of time permitted for the compilations due to the desirability of having the results available at the close of the year with which they deal. However, it is believed that such omissions as occur will be found to be small and unimportant, and will not vitiate the value of the figures, particularly as concerns comparison with preceding years which, after all, is the primary purpose of the compilations."

Freight Car Orders in 1930

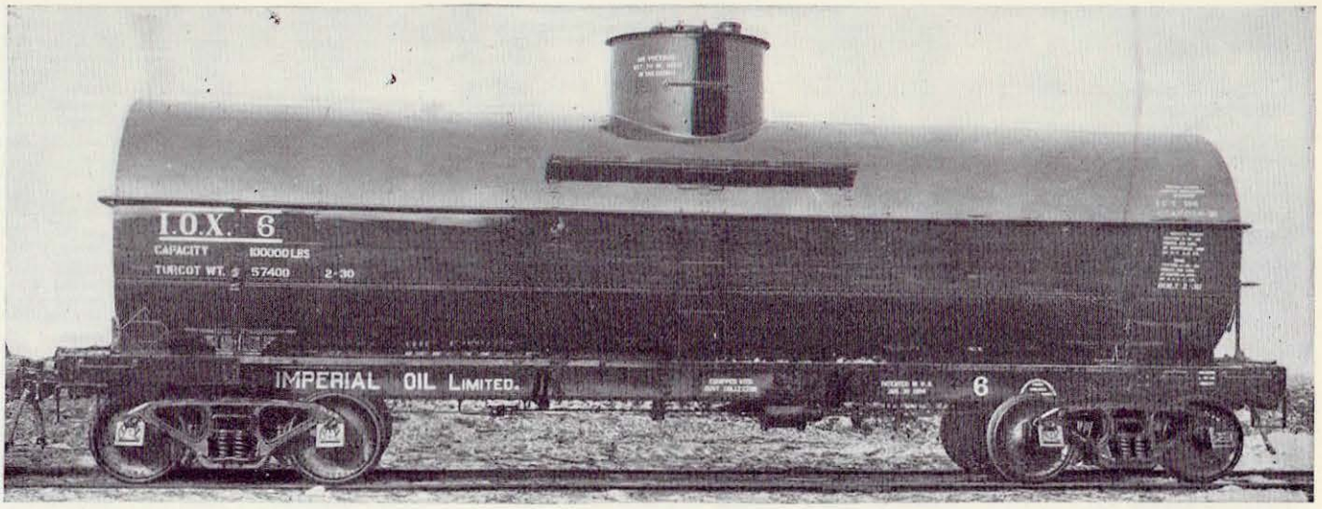
For Service in the United States

Purchaser	No.	Class	Capacity	Length Ft.	Length In.	Construction	Weight	Date of Order	Date of Delivery	Builder
Alcoa Ore Co.	25	Hopper	.....	40	6	Steel	.....	June	.....	Canton Car
	20	Hopper	.....	44	6	Steel	.....	June	.....	Canton Car
American Agric. Chem. Co.	3	Tank	140,000	...	...	Steel	.....	July	.....	Gen. Amer. Tank
American Refrigerator Transit Co.	419	Refrigerator	80,000	33	2½	St. Und'frame	55,900	March	July	Mt. Vernon Car
	200	Refrigerator	80,000	30	6½	St. Und'frame	52,400	March	August	Mt. Vernon Car
	400	Refrigerator	80,000	33	2½	St. Und'frame	55,700	March	September	Mt. Vernon Car
Anaconda Copper Mining Co.	15	Tank	8,000g.	31	6	Steel	46,600	July	December	Am. Car & Fdy.
	2	Tank	4,000g.	24	9½	Steel	35,200	July	October	Am. Car & Fdy.
Arkansas & Louisiana Missouri	2	Caboose	.....	33	0	St. Und'frame	47,420	April	August	St. Louis Car
Atchison, Topeka & Santa Fe	400	Refrigerator	80,000	40	4	Steel Frame	.....	December	1931	Pullman
	100	Refrigerator	100,000	49	5¾	Steel Frame	.....	December	1931	Pullman
	350	Box	100,00	40	6	Steel Frame	.....	December	1931	Pressed Steel
	350	Box	100,00	40	6	Steel Frame	.....	December	1931	Gen. Amer. Car
	300	Box	100,00	40	6	Steel Frame	.....	December	1931	Am. Car & Fdy.
	22	Caboose	.....	28	4⅞	Steel	.....	December	1931	Am. Car & Fdy.
Atlanta & West Point and Western Ry. of Alabama	15	Stock	60,000	36	4	Steel Frame	43,000	.....	1930	Company Shops
Baltimore & Ohio	1,000	D. S. Box	100,000	40	6	Steel	47,600	November	Mar. '31	Standard Steel
	1,000	Gondola	100,000	49	11⅞	Steel	52,000	.....	.....	Company Shops
	1	D. S. Caboose	.....	23	4⅜	Steel	41,700	August	December	Company Shops
Bangor & Aroostook	400	S. S. Box	80,000	40	4½	Steel Frame	42,400	February	October	Company Shops
Barnsdall Refineries, Inc.	1	Tank	8,000g.	36	6	Steel	48,000	January	March	Pet. Iron Wks.
	5	Tank	8,000g.	36	6	Steel	44,500	April	June	Pet. Iron Wks.
	5	Tank	6,000g.	32	5	Steel	44,100	April	June	Pet. Iron Wks.
	1	Tank	8,000g.	36	6	Steel	44,500	September	December	Pet. Iron Wks.
Birmingham Southern	25	Box	100,000	...	...	.....	.....	January	.....	Pullman
Brown Company	1	Tank	60,000	30	10	Steel	55,000	October	November	Am. Car & Fdy.
	1	Tank	30,000	42	2¾	Steel	33,400	November	November	Am. Car & Fdy.
Buckeye Steel Castings Co.	12	Gondola	140,000	38	2½	Steel	57,000	February	May	Ralston Steel

Purchaser	No.	Class	Capacity	Length Ft.	Length In.	Construction	Weight	Date of Order	Date of Delivery	Builder
Butte, Anaconda & Pacific	2	Tank	100,000	36	3¾	Steel	46,500	July	October	Am. Car & Fdy.
	1	Tank	100,000	36	3¾	Steel	45,900	July	October	Am. Car & Fdy.
	1	Tank	100,000	36	3¾	Steel	46,600	July	October	Am. Car & Fdy.
	1	Tank	100,000	36	3¾	Steel	46,700	July	October	Am. Car & Fdy.
	1	Tank	100,000	36	3¾	Steel	46,300	July	October	Am. Car & Fdy.
	4	Tank	100,000	36	3¾	Steel	46,600	July	November	Am. Car & Fdy.
	1	Tank	100,000	36	3¾	Steel	46,700	July	November	Am. Car & Fdy.
	2	Tank	100,000	36	3¾	Steel	46,500	July	November	Am. Car & Fdy.
	1	Tank	100,000	36	3¾	Steel	46,400	July	November	Am. Car & Fdy.
	1	Tank	60,000	29	2½	Steel	35,200	July	October	Am. Car & Fdy.
	1	Tank	60,000	29	2½	Steel	35,100	July	October	Am. Car & Fdy.
	1	Tank	100,000	36	3¾	Steel	47,100	July	November	Am. Car & Fdy.
California Dispatch Line	5	Tank	8,000g.	31	6	Steel	42,200	March	April	Am. Car & Fdy.
	1	Tank	6,100g.	28	9	Steel	49,400	May	July	Am. Car & Fdy.
Calumet & Hecla Consol. C. Co.	4	Air Dump	20 cu. yd.	.....	.....	.....	.....	February	.....	Koppel
Canton Tank Car Co.	1,000	Tank	8,000g.	31	6	Steel	41,300	January	.....	Am. Car & Fdy.
Carbide & Carbon Chem. Corp.	5	Tank	40,000	36	7	Steel	69,300	January	1930	Am. Car & Fdy.
	5	Tank	84,000	.....	.....	Steel	.....	August	1930	Gen. Amer. Tank
Carnegie Steel Co.	30	Gondola	140,000	32	11½	Steel	.....	December	Mar. '31	Am. Car & Fdy.
	20	Flat	140,000	38	6	Steel	.....	December	Mar. '31	Pressed Steel
	18	Flat	140,000	38	6	Steel	.....	December	Mar. '31	Standard Steel
Central Alloy Steel Co.	6	Flat	.....	35	6	Steel	.....	February	May	Canton Car
	1	Air Dump	100,000	34	0	Steel	69,500	March	March	Koppel
Chesapeake & Ohio	3,000	Gondola	100,000	40	6	Steel	43,700	February	November	Am. Car & Fdy.
	1,500	Hopper	140,000	41	2⅞	Steel	53,000	February	December	Richmond Car
	1,500	S. S. Box	100,000	40	6	Steel	46,000	February	October	Standard Steel
	500	S. S. Box	100,000	40	6	Steel Frame	46,000	February	August	Pressed Steel
	4	Air Dump	30 cu. yd.	.....	.....	.....	.....	May	.....	Magor
Chicago & North Western	10	Flat	140,000	46	0	St. Und'frame	48,400	June	September	Am. Car & Fdy
	2	Flat	180,000	.....	.....	.....	.....	.....	1930	Company Shops
	2	Flat	400,000	.....	.....	.....	.....	.....	1930	Company Shops
Chicago, Burlington & Quincy	300	Automobile	100,000	40	6	St. Und'frame	52,400	Dec. '29	1930	Pressed Steel
	200	Automobile	100,000	40	6	St. Und'frame	54,500	Dec. '29	1930	Pressed Steel
	600	Flat	100,000	45	0	St. Und'frame	40,800	May	1930	Company Shops
Chicago Great Western	500	D. S. Box	100,000	40	0	Steel	48,000	October	Jan. '31	Pullman
	300	Hopper	140,000	41	3	Steel	52,000	November	Feb. '31	Pullman
Chic., Milwaukee, St. P. & Pac.	200	S. S. Box	100,000	40	6	Steel Frame	45,300	February	June	Pac. Car & Fdy.
	500	Gondola	140,000	48	6	Steel Frame	59,800	February	August	Pressed Steel
	300	Flat	100,000	50	0	Steel Frame	44,400	February	June	Ryan
	500	Box	100,000	40	6	St. Und'frame	46,500	January	June	Am. Car & Fdy.
	300	Flat	100,000	50	0	St. Und'frame	44,500	February	May	Pullman
	500	Gondola	140,000	49	1½	Steel Frame	59,400	January	April	Bettendorf
	500	Stock	80,000	40	6	Steel	45,400	June	September	Gen. Amer. Car
	2	Air Dump	20 cu. yd.	.....	.....	.....	.....	April	.....	W. Wh. Scraper
	10	Gondola	.....	.....	.....	.....	.....	.....	.....	Company Shops
Chicago, West Pullman & Southern	7	.....	.....	.....	.....	.....	.....	.....	1930	Company Shops
Cities Service Trans. Co.	10	Tank	10,000g.	31	6	Steel	49,300	May	July	Am. Car & Fdy.
City of Chicago	1	Hopper	.....	.....	.....	.....	.....	December	.....	Mt. Vernon Car
Columbian Gasoline Corp.	27	Tank	8,000g.	31	6	Steel	46,900	April	June	Am. Car & Fdy.
	50	Tank	.....	.....	.....	Steel	.....	.....	.....	Gen. Amer. Tank
Cook Paint & Varnish Co.	2	Tank	4,000g.	32	5	Steel	40,000	January	March	Pet. Iron Wks.
Coos Bay Lumber Co.	2	.....	.....	.....	.....	.....	.....	.....	1930	Company Shops
Crew Levick Co. of Pennsylvania	10	Tank	100,000	.....	.....	Steel	.....	May	July	Am. Car & Fdy.
Crystal Car Line	75	Tank	100,000	36	8½	Steel	44,000	Dec. '29	March	Gen. Amer. Tank
Delaware & Hudson	600	Hopper	85,000	32	5⅝	Steel Frame	38,800	January	November	Company Shops
Delaware, Lackawanna & Western	25	Gondola	140,000	65	0	Steel	67,400	July	October	Magor
Detroit-Edison Company	5	Hopper	140,000	40	0	Steel	53,300	July	October	Am. Car & Fdy.
Diamond Alkali Co.	1	Tank	30,000	42	3	Steel	32,100	October	October	Am. Car & Fdy.
Duquesne Slag Products	1	Air Dump	100,000	34	0	Steel	70,900	March	March	Koppel
East Broad Top R. R. & C.	4	.....	.....	.....	.....	.....	.....	1930	1930	Company Shops
Eastern Michigan	10	Ballast	80,000	34	11	St. Und'frame	39,200	February	May	Rodger Ballast
Eastman Kodak Co.	2	Tank	8,000g.	.....	.....	Steel	.....	January	.....	Gen. Amer. Tank
Electro Metallurgical Co.	1	Hopper	100,000	30	0	Steel	38,400	June	September	Am. Car & Fdy.
Elgin, Joliet & Eastern	124	Special	.....	.....	.....	.....	.....	.....	1930	Company Shops
Empire Companies	6	Side Dump	40,000	16	6	Steel	28,700	January	March	Koppel
	2	Side Dump	40,000	16	6	Steel	28,700	July	September	Koppel
Empire Oil & Refining Co.	100	Tank	80,000	41	4¼	Steel	41,500	February	May	Gen. Amer. Tank
Erie	450	Gondola	140,000	50	6	Steel	56,700	June	July-Aug.	Greenville St.
	50	Gondola	140,000	65	6	Steel	71,000	June	Nov.-Dec.	Pressed Steel
	800	Hopper	140,000	41	2⅞	Steel	52,700	June	July-Sept.	Standard Steel
	150	Hopper	140,000	40	5	Steel	62,500	June	Sept.-Oct.	Am. Car & Fdy.
	500	Box	100,000	40	6	Steel	47,200	June	July-Sept.	Am. Car & Fdy.
	100	Automobile	80,000	40	6	Steel	54,200	June	September	Pressed Steel
	200	Automobile	80,000	40	6	Steel	52,600	June	Oct.-Nov.	Am. Car & Fdy.
	100	Furniture	80,000	50	6	Steel	61,300	June	Oct.-Nov.	Pressed Steel
	25	Caboose	.....	25	6	Steel	44,200	July	September	Magor



Pennsylvania 90-Ton Hopper Car



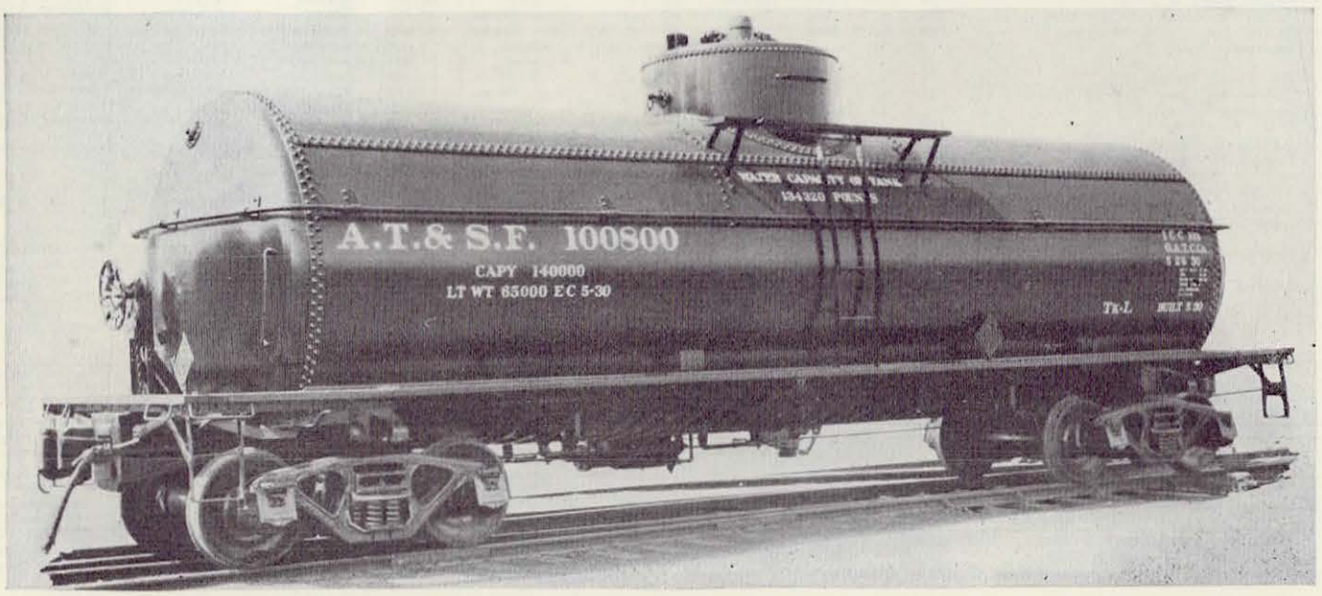
Imperial Oil Insulated Tank Car for Handling Gasoline—Built by Canadian Car & Foundry Company, Ltd.

Purchaser	No.	Class	Capacity	Length Ft.	Length In.	Construction	Weight	Date of Order	Date of Delivery	Builder
Ethyl Gasoline Corp.	3	Tank	3,000g.	31	6	Steel	41,400	April	June	Am. Car & Fdy.
Everist, L. G.	1	Air Dump	80,000	25	8	Steel	51,700	December	December	Koppel
Fleischmann Transportation Co.	†24	Tank	100,000	.....		St. Und'frame	.....	1930	1930	Company Shops
	†9	Tank	100,000	.....		St. Und'frame	.....	1930	1930	Company Shops
	1	Tank	8,000g.	.....		Steel	.....	February	.....	Gen. Amer. Tank
Freedom Oil Company	2	Tank				Steel	.....	April	.....	Gen. Amer. Tank
Fruit Growers' Express	31	Refrigerator	75,000	33	2¾	St. Und'frame	56,200	1929	January	Company Shops
	27	Refrigerator	75,000	33	2¾	St. Und'frame	56,200	1929	February	Company Shops
	12	Refrigerator	75,000	33	2¾	St. Und'frame	56,200	1929	March	Company Shops
	5	Refrigerator	75,000	33	2¾	St. Und'frame	56,200	1929	April	Company Shops
	5	Refrigerator	75,000	33	2¾	St. Und'frame	56,200	1929	May	Company Shops
	18	Refrigerator	75,000	33	2¾	St. Und'frame	56,200	1929	June	Company Shops
	32	Refrigerator	75,000	33	2¾	St. Und'frame	56,200	March	September	Company Shops
	64	Refrigerator	75,000	33	2¾	St. Und'frame	56,200	March	October	Company Shops
	33	Refrigerator	75,000	33	2¾	St. Und'frame	56,200	March	November	Company Shops
	25	Refrigerator	75,000	33	2¾	St. Und'frame	56,200	April	December	Company Shops
General Chemical Co.	11	Tank	100,000	28	3	Steel	44,000	June	October	Am. Car & Fdy.
	15	Tank	9,800g.	31	9¾	Steel	54,800	January	April	Am. Car & Fdy.
	5	Flat	100,000	36	0	Steel	17,220	March	May	Am. Car & Fdy.
	33	Tank	58,000	28	9½	Steel	39,700	March	November	Am. Car & Fdy.
	7	Tank	76,000	28	6	Steel	42,500	March	November	Am. Car & Fdy.
	35	Tank	9,800g.	31	9¾	Steel	55,500	June	September	Am. Car & Fdy.
General Electric Co.	1	Tank	8,000g.	31	6	Steel	44,500	April	June	Am. Car & Fdy
	5	Flat	100,000	.....		St. Und'frame	.....	March	.....	Am. Car & Fdy.
Grace, John H. Jr.	10	Tank	8,000g.	31	6	Steel	42,100	April	May	Am. Car & Fdy.
Grasselli Chemical Co.	1	Tank	100,000	31	9	Steel	43,300	February	August	Am. Car & Fdy.
Great Northern	100	Hopper	.....	32	0	Steel	37,700	June	August	Canton Car
Green Bay & Western	50	S. S. Box	80,000	40	6	Steel Frame	45,398	May	September	Bettendorf
	50	S. S. Auto	80,000	40	6	Steel Frame	47,566	May	September	Bettendorf
Gulf Companies	250	Tank	8,000g.	.....		Steel	.....	July	Oct.-Nov.	Standard Tank
	250	Tank	8,050g.	36	6	Steel	42,000	July	Oct.-Nov.	Pet. Iron Wks.
Haley, Chisholm & Morris	10	Air Dump	80,000	.....		Steel	54,000	September	October	Koppel
Heinz Co., H. J.	†1	Tank	100,000	40	2	St. Und'frame	35,020	January	February	Am. Car & Fdy
Hercules Cement Corp.	9	Cement	.....	.....		.....	.....	January	.....	Standard Steel
	10	Hopper	140,000	37	3	Steel	48,000	October	Apr. '31	Standard Steel
Huron Portland Cement Co.	10	Gondola	100,000	23	4	Steel	41,000	July	November	Nat'l. Dump Car
Illinois Steel Co.	5	Flat	200,000	25	0	Steel	39,840	August	November	Am. Car & Fdy.
	105	Ingot	.....	.....		.....	.....	August	.....	Am. Car & Fdy.
	10	Transfer	.....	.....		.....	.....	September	.....	Lorain Steel
Inland Lime & Stone Co.	14	Side Dump	100,000	32	6	Steel	68,500	March	August	Koppel
International Great Northern	150	S. S. Box	80,000	40	6	Steel Frame	43,300	May	May	Company Shops
	168	S. S. Box	80,000	40	6	Steel Frame	42,900	September	October	Company Shops
Interstate Iron Co.	21	Air Dump	100,000	25	2¾	Steel	65,000	August	Jan. '31	Koppel
	21	Air Dump	100,000	32	6¼	Steel	72,000	August	Jan. '31	Koppel
Isle Royal Copper Co.	4	Air Dump	80,000	25	8	Steel	52,000	January	March	Koppel
Kewaunee, Green Bay & Western	25	S. S. Box	80,000	40	6	Steel Frame	45,376	May	September	Bettendorf
Keystone Gravel Co.	1	Air Dump	80,000	25	8	Steel	52,000	December	December	Koppel
L. C. L. Corp.	100	Flat	140,000	50	10¼	Steel	54,000	April	November	Standard Steel
LaSalle & Bureau City	2	S. S. Box	100,000	40	6	Steel Frame	48,800	1930	.....	Pullman
Lehigh & New England	300	S. S. Box	100,000	40	6	Steel	46,000	September	December	Magor
	5	Caboose	.....	23	3	St. Und'frame	40,000	September	Jan. '31	Magor
Lehigh Nav. Coal Co.	7	Air Dump	30 cu. yd.	.....		.....	.....	June		Magor
Lennig, Chas. & Co., Inc.	1	Tank	6,000g.	27	6	Steel	45,800	October	December	Am. Car & Fdy.
Lorain Steel Co.	1	Air Dump	100,000	34	0	Steel	69,800	February	February	Koppel
	1	Air Dump	100,000	34	0	Steel	69,800	June	June	Koppel
Louisiana & Arkansas	300	S. S. Box	80,000	40	6	Steel	43,500	March	August	Gen. Amer. Car
	200	S. S. Auto	80,000	40	6	Steel	49,500	March	September	Gen. Amer. Car
Louisville & Nashville	500	Gondola	100,000	41	3	Steel	44,000	February	June	Pressed Steel
	300	Hopper	100,000	34	0	Steel	45,900	February	June	Pressed Steel
	500	S. S. Box	100,000	40	6	Steel Frame	44,300	February	June	Mt. Vernon Car
	250	Flat	100,000	45	0	Steel	43,600	February	June	Pressed Steel
	250	Gondola	140,000	45	0	Steel	50,000	February	June	Pullman
Magnolia Petroleum Co.	1	Tank	80,000	.....		Steel	.....	September	October	Gen. Amer. Tank
Maine Central	5	Hopper	140,000	41	3	Steel	52,200	September	October	Standard Steel
Manila Railroad	6	Hopper	80,000	.....		.....	.....	January	.....	Am. Car & Fdy.
Material Service Corp.	4	Side Dump	50,000	19	0	Steel	31,000	February	February	Koppel
Mather Stock Car Co.	200	Stock	.....	.....		.....	.....	September	.....	Company Shops
Mathieson Alkali Works, Inc.	4	Tank	80,000			St. Cent. Sill	62,000	July	July-Aug	Standard Tank
Merchants Despatch	1,200	Refrigerator	70,000	33	1	St. Und'frame	56,200	April	December	Company Shops
Mills, H. L.	3	Tank	4,000g.	24	3	Steel	33,500	April	June	Am. Car & Fdy.
Minneapolis & St. Louis	500	S. S. Box	80,000	40	6	Steel	43,800	August	Oct.-Dec.	Gen. Amer. Car
Minneapolis, St. P. & S. S. Marie	200	S. S. Box	80,000	40	0	Steel Frame	42,600	March	November	Siems-Stembel
	200	Hopper	100,000	34	9	Steel	44,000	March	August	Siems-Stembel
Missouri-Kansas-Texas	100	Hopper	140,000	40	5	Steel	61,900	April	August	Gen. Amer. Car
	500	Gondola	140,000	41	3	Steel	49,000	January	December	Company Shops
	25	Caboose	.....	28	3½	Steel Frame	46,000	November	December	Company Shops

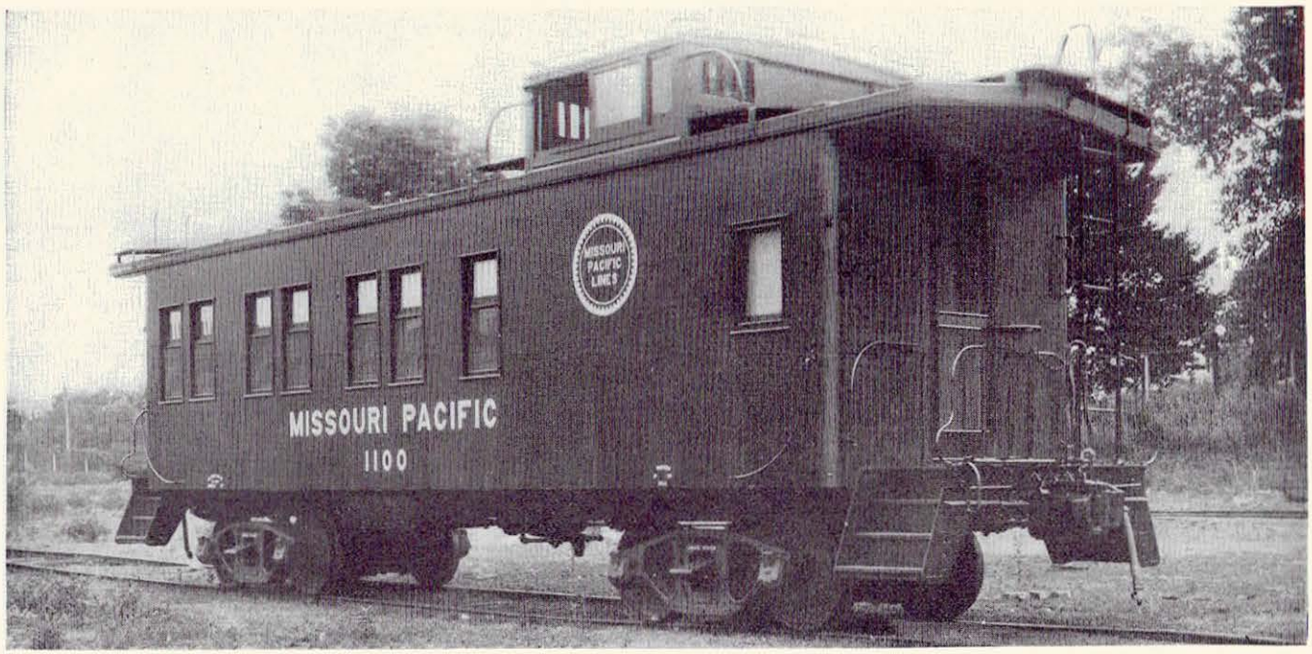
† Wooden Tank

Purchaser	No.	Class	Capacity	Length Ft.	Length In.	Construction	Weight	Date of Order	Date of Delivery	Builder
Missouri Pacific	20	Caboose	.....	33	0	St. Und'frame	48,400	February	August	St. Louis Car
	625	Coal	100,000	.....		St. Und'frame	.....	.....	1930	Company Shops
Mobile & Ohio	1	Caboose	.....	.....		.....	.....	.....	1930	Company Shops
Monessen Southwestern	10	Gondola	140,000	.....		Steel	.....	February	May	Pressed Steel
National Tube Co.	3	Flat	140,000	31	1	Steel	54,300	February	May	Greenville St.
	3	Flat	80,000	42	0	Steel	21,000	October	December	Koppel
New Orleans Great Northern	200	Gondola	100,000	41	0	.....	44,000	.....	1930	Company Shops
New York Central	1,000	Auto-Box	110,000	40	6	Steel	53,500	April	November	Merch. Despatch
	2	Flat	400,000	44	0	Steel	102,000	October	December	Merch. Despatch
New York, New Haven & Hartford	15	Coke	80,000	40	0	Steel	49,000	April	August	Standard Steel
Newburgh & South Shore	3	Gondola	140,000	.....		Steel	.....	.....	1930	Company Shops
Norfolk & Western	500	Box	100,000	40	6	Steel	50,700	February	June-Sept.	Company Shops
	500	Box	100,000	40	6	Steel	50,300	June	Oct.-Feb. '31	Company Shops
North American Car Corp.	50	Tank	80,000	.....		Steel	47,500	January	April	Pressed Steel
	75	Tank	100,000	.....		Steel	58,900	March	July	Pressed Steel
	100	Refrigerator	80,000	38	1¾	St. Und'frame	55,000	May	September	Pressed Steel
	50	Refrigerator	.....	.....		.....	.....	1930	.....	Company Shops
North Western Refrigerator Line	51	Refrigerator	80,000	32	9¾	St. Und'frame	54,000	.....	October	Company Shops
Northern Pacific	250	Stock	80,000	40	6	Steel Frame	42,900	April	August	Ryan
	1,000	Refrigerator	.....	.....		.....	.....	December	.....	Company Shops
Oliver Iron Mining Co.	10	Air Dump	30 cu. yd.	34	0	Steel	96,000	March	August	Magor
	10	Air Dump	30 cu. yd.	34	0	Steel	87,000	March	September	Koppel
Oregon-Washington R. R. & Nav.	20	Ore	140,000	39	0	Steel	65,000	June	December	St. Louis Car
Otis Steel Co.	6	Hopper	.....	32	0	Steel	41,700	April	July	Canton Car
Pacific Fruit Express	500	Refrigerator	80,000	39	9⅛	Steel Frame	56,300	March	July-Sept.	Company Shops
Palace Live Poultry Car Co.	15	Poultry	60,000	36	5¼	St. Und'frame	57,800	June	August	Company Shops
Panama Railroad	*5	Refrigerator	100,000	34	0	Steel Frame	50,900	1930	.....	Company Shops
Panhandle Refining Co.	25	Tank	80,000	.....		Steel	.....	.....	June	Gen. Amer. Tank
Pennsylvania	200	Gondola	140,000	65	6	Steel	62,200	April	December	Company Shops
	1,500	Gondola	140,000	65	6	Steel	62,200	November	Apr. '31	Company Shops
Pennsylvania Salt Mfg. Co.	2	Tank	30,000	42	3	Steel	30,100	September	September	Am. Car & Fdy.
	3	Tank	.....	24	3	Steel	33,500	November	December	Am. Car & Fdy.
	1	Tank	4,000g.	.....		Steel	.....	March	.....	Gen. Amer. Tank
Pennsylvania Tank Line	600	Tank	10,100g.	36	6	Steel	46,500	January	Mar.-May	Pet. Iron Wks.
	8	Tank	8,050g.	36	6	Steel	40,500	April	June	Pet Iron Wks.
Pere Marquette	100	Flat	100,000	42	1½	Steel	37,700	January	June	Bethlehem
	750	Gondola	100,000	40	6	Steel	42,800	January	June-July	Ralston Steel
	250	Gondola	140,000	50	6	Steel	55,800	January	May	Greenville St.
	250	Box	75,000	50	6	Steel	60,500	January	October	Pressed Steel
	1,500	Box	100,000	40	6	Steel	47,500	January	June-Aug.	Standard Steel
	1,500	Auto Box	80,000	40	6	Steel	52,500	January	May-Aug.	Pullman
	500	Auto Box	80,000	40	6	Steel	53,500	January	Aug.-Sept.	Pressed Steel
	25	Caboose	.....	.....		Steel Frame	.....	January	July	Magor
Philadelphia Quartz Co.	5	Tank	70,000	32	6¼	Steel	47,320	July	Aug.-Oct.	Am. Car & Fdy.
Philadelphia Quartz Co. of Cal.	2	Tank	8,000g.	31	6	Steel	43,800	July	August	Am. Car & Fdy.
Philippine Railway	20	Cane	20,000	.....		Steel	.....	June	September	Koppel
	15	Cane	60,000	.....		Steel	.....	June	August	Koppel
Phillips Petroleum Co.	10	Tank	11,097g.	.....		Steel	69,700	May	August	Standard Tank
	5	Tank	10,569g.	.....		Steel	74,700	May	July	Standard Tank
Piedmont & Northern	4	Air Dump	80,000	23	3	Steel	54,000	February	September	Koppel
Publicker Comm. Alcohol Co.	2	Tank	8,000g.	36	6	Steel	44,500	October	December	Pet. Iron Wks.
Reading	10	Caboose	.....	25	0	Steel	44,000	Dec. '29	July	Company Shops
	20	Caboose	.....	.....		.....	.....	November	.....	Company Shops
Roebling, John A., Sons	4	Flat	100,000	39	10½	Steel	67,250	June	August	Am. Car & Fdy.
St. Louis-San Francisco	1	Gondola	100,000	41	6	Steel Frame	45,500	.....	October	Company Shops
	3	Hopper	100,000	30	0	Steel	41,500	.....	August	Company Shops
	14	Auto Box	100,000	40	6	Steel Frame	48,100	.....	October	Company Shops
Sanitary Dist. of Chicago	25	Dump	.....	.....		.....	.....	December	.....	W. Wh. Scraper
Seaboard Air Line	1,000	S. S. Box	100,000	40	6½	Steel Frame	45,900	June	September	Pullman
	1,000	S. S. Box	100,000	40	6½	Steel Frame	46,300	June	November	Richmond Car
Shell Petroleum Corp.	12	Tank	10,000g.	35	5	Steel	70,200	May	July	Am. Car & Fdy.
Shippers' Car Line	10	Tank	10,000g.	31	6	Steel	45,700	January	February	Am. Car & Fdy.
	50	Tank	10,000g.	31	6	Steel	46,300	April	June	Am. Car & Fdy.
	4	Tank	6,000g.	27	6	Steel	43,800	April	May	Am. Car & Fdy.
	2	Tank	8,000g.	31	6	Steel	47,200	April	May	Am. Car & Fdy.
	1	Tank	8,000g.	31	6	Steel	44,600	May	June	Am. Car & Fdy.
	15	Tank	8,000g.	31	6	Steel	40,500	May	May	Am. Car & Fdy.
	35	Tank	10,000g.	31	6	Steel	46,400	May	June	Am. Car & Fdy.
	50	Tank	8,000g.	31	6	Steel	40,700	May	July	Am. Car & Fdy.

* Not included in totals.



Atchison, Topeka & Santa Fe 16,200-gal. Tank Car with Cast-Steel Bottom—Built by General American Tank Car Company



Missouri Pacific Drovers' Caboose—Built by St. Louis Car Company

Purchaser	No.	Class	Capacity	Length Ft.	Length In.	Construction	Weight	Date of Order	Date of Delivery	Builder
Skelly Oil Co.	1	Tank	100,000	40	6	Steel	84,800	January	April	Am. Car & Fdy.
	1	Tank	100,000	40	6	Steel	85,700	May	June	Am. Car & Fdy.
	1	Tank	100,000	40	6	Steel	84,500	May	June	Am. Car & Fdy.
	1	Tank	100,000	40	6	Steel	82,800	July	September	Am. Car & Fdy.
	1	Tank	100,000	40	6	Steel	82,900	July	September	Am. Car & Fdy.
	1	Tank	100,000	40	6	Steel	68,600	May	July	Am. Car & Fdy.
	1	Tank	100,000	40	6	Steel	68,800	May	July	Am. Car & Fdy.
	1	Tank	100,000	40	6	Steel	69,000	May	July	Am. Car & Fdy.
	1	Tank	100,000	40	6	Steel	69,200	May	July	Am. Car & Fdy.
	1	Tank	100,000	40	6	Steel	67,700	July	September	Standard Tank
	2	Tank	100,000	40	6	Steel	67,900	July	September	Standard Tank
	1	Tank	100,000	40	6	Steel	67,800	July	September	Standard Tank
Solvay Process Co.	1	Tank	60,000	42	3	Steel	30,100	January	January	Am. Car & Fdy.
Southern Acid & Sulphur Co.	4	Tank	9,500g.	30	9¾	Steel	54,700	March	May	Am. Car & Fdy.
Southern Pacific	300	Automobile	100,000	50	1	Steel	61,200	January	June	Pressed Steel
	100	Gondola	100,000	48	0	Steel	51,000	January	June	Ralston Steel
	25	Caboose	.....	.....		.....	.....	.....	1930	Company Shops
Spokane, Portland & Seattle	5	Caboose	.....	.....		St. Cent. Sill	36,000	March	September	Gt. Nor. Shops
Standard Ref. Car Co.	45	Refrigerator	80,000	30	6	St. Und'frame	57,400	November	Jan. '31	English Car
Stauffer Chemical Co.	1	Tank	100,000	.....		Steel	.....	January	April	Gen. Amer. Tank
Sun Oil Co.	20	Tank	100,000	.....		Steel	58,00	January	March	Standard Tank
Tacoma Electrochemical Co.	1	Tank	60,000	42	3	Steel	30,100	June	June	Am. Car & Fdy.
Tennessee Copper Co.	50	Tank	100,000	.....		Steel	42,600	August	December	Gen. Amer. Tank
Texas & Pacific	25	Caboose	.....	.....		.....	.....	March	.....	Pullman
Texas Co.	325	Tank	100,000	.....		Steel	57,060	February	April	Am. Car & Fdy.
Texas Chemical Co.	4	Tank	12,000g.	39	1⅝	Steel	60,500	October	December	Am. Car & Fdy.
Tidal Refining Co.	92	Tank	80,000	39	4	Steel	41,200	January	March	Gen. Amer. Tank
Union Gas & Electric Co.	1	Well	200,000	.....		.....	.....	February	.....	St. Louis Car
Union Oil Co. of Cal.	30	Tank	100,000	36	8½	Steel	58,200	January	May	Gen. Amer. Tank
	10	Tank	80,000	35	2½	Steel	49,000	January	June	Company Shops
	20	Tank	80,000	35	2½	Steel	39,000	January	April	Gen. Amer. Tank
Union Pacific	300	Flat	100,000	52	0	Steel	46,000	May	November	Gen. Amer. Tank
	20	Ore	140,000	28	0	Steel	65,000	June	.....	St. Louis Car
Union Refrigerator Transit Co.	200	Refrigerator	70,000	40	0	St. Und'frame	57,000	October	Feb. '31	Gen. Amer. Car
	700	Refrigerator	.....	.....		.....	.....	.....	1930	Company Shops
Union Tank Car Co.	16	Tank	100,000	42	11	Steel	85,800	September	1930	Company Shops
	3	Tank	11,000g.	38	9¾	Steel	86,300	February	May	Am. Car & Fdy.
United Refining Co.	2	Tank	80,000	.....		Steel	35,000	June	July	Standard Tank
U. S. Navy	2	Flat	100,000	37	11¾	St. Und'frame	43,300	July	October	Am. Car & Fdy.
	2	Box	100,000	40	3⅛	Steel	50,600	July	October	Am. Car & Fdy.
	1	Box	100,000	40	3⅛	Steel	50,600	July	October	Am. Car & Fdy.
	4	Tank	.....	.....		Steel	.....	March	.....	Gen. Amer. Tank
Virginian	500	Hopper	110,000	32	9	Steel	42,500	May	July	Va. Bridge & Iron
	600	Hopper	110,000	32	9	Steel	42,500	October	Jan. '31	Va. Bridge & Iron
Viscose Co.	2	Flat	140,000	60	0	St. Und'frame	58,000	July	October	Pressed Steel
Wagner Quarries	2	Air Dump	100,000	34	0	Steel	71,400	January	January	Koppel
Warrior River Terminal Co.	62	Gondola	140,000	45	0	Steel	52,200	April	July	Pullman
Waugh Brothers, Inc.	2	Air Dump	80,000	25	8	Steel	52,800	October	October	Koppel
	1	Air Dump	80,000	25	8	Steel	50,600	October	October	Koppel
Waukegan Generating Co.	1	Hopper	140,000	39	0	Steel	57,300	September	November	Mt. Vernon Car
Western Electric Co.	10	Flat	200,000	45	0	Steel	63,100	June	August	Koppel
Western Fruit Express	9	Refrigerator	75,000	33	2¾	St. Und'frame	56,200	April	September	Company Shops
	3	Refrigerator	75,000	33	2¾	St. Und'frame	56,200	April	October	Company Shops
	10	Refrigerator	125,000	42	6	St. Und'frame	84,000	April	November	Company Shops
	50	Refrigerator	125,000	42	6	St. Und'frame	84,000	April	December	Company Shops
Westinghouse E. & M. Co.	6	Air Dump	100,000	34	0	Steel	71,200	April	May	Koppel
Westvaco Chlor. Prod. Co.	2	Tank	30,000	28	6	Steel	46,800	January	January	Am. Car & Fdy.
	1	Tank	30,000	42	3	Steel	30,100	February	February	Am. Car & Fdy.
White Eagle Oil Corp.	25	Tank	8,000g.	36	8½	Steel	43,500	February	May	Gen. Amer. Tank
White Star Refining Co.	1	Tank	10,000g.	.....		Steel	46,000	June	September	Pet. Iron Wks.

Export

Purchaser	No.	Class	Capacity	Length Ft.	Length In.	Construction	Weight	Date of Order	Date of Delivery	Builder
American Smelting & Ref. Co.	75	Gondola	50,000	.....		Steel	.....	August	October	Koppel

Purchaser	No.	Class	Capacity	Length Ft.	In.	Construction	Weight	Date of Order	Date of Delivery	Builder
Anderson, Meyer & Co., Ltd.	10	Gondola	40,000	.....		Steel	.....	June	October	Koppel
	10	Flat	28,000	.....		Steel	.....	July	October	Koppel
	8	Gondola	28,000	.....		Steel	.....	July	October	Koppel
	2	S. S. Box	28,000	.....		Steel	.....	July	October	Koppel
	6	.....	28,000	.....		Steel	.....	July	October	Koppel
Anglo-Chilean Cons. Nit. Corp.	350	Gondola	60,000	22	9	Steel	40,000	July	December	Pressed Steel
	225	Flat	44,000	22	4	Steel	16,425	January	Mar.-Apr.	Magor
	26	S. S. Box	44,000	22	4	Steel Frame	23,300	February	April	Magor
	30	Side Dump	60,000	.....		Steel	.....	January	April	Koppel
	50	Air Dump	.....	.....		.....	.....	August	.....	Magor
Anglo-Mexican Petroleum Co.	1	Tank	5,338g.	.....		Steel	32,600	March	June	Gen. Amer. Tank
	2	Tank	6,640g	.....		Steel	30,300	March	June	Gen. Amer. Tank
Asiatic Petroleum	1	Tank	6,000g.	.....		Steel	.....	November	Jan. '31	Koppel
	2	Tank	80,000	.....		Steel	.....	August	December	Koppel
Cia Azuerera Del Mante	25	Cane	40,000	.....		Steel	.....	August	November	Koppel
Central Aguirre Sugar Co.	7	Box	40,000	.....		Steel	.....	May	August	Koppel
	20	Cane	30,000	.....		Steel	.....	May	August	Koppel
Huasteca Petroleum Co.	4	Tank	80,000	31	6	Steel	46,500	October	November	Am. Car & Fdy
International Products Corp.	10	Logging	30,000	.....		Steel	.....	March	May	Koppel
International Rys. of Cent. Am.	35	Stock	50,000	36	0	Steel Frame	27,385	February	May	Gregg
	2	Dump	40,000	20	0	.....	28,800	May	July	W. Wh. Scraper
J. L. DeS.Usina Bom Jesus (Santos)	15	Cane	20,000	.....		Steel	.....	June	August	Koppel
Jeronymo Mines (Brazil)	39	Coal	66,000	33	3	Steel	31,000	August	November	Standard Steel
Mexican Petroleum Corp.	30	Tank	100,000	36	8½	Steel	60,250	February	May	Gen. Amer. Tank
	5	Tank	100,000	36	8½	Steel	53,400	February	May	Gen. Amer. Tank
Mexican Railway	85	Box	60,000	26	0	Steel	.....	September	December	Koppel
	15	Auto	60,000	40	6	Steel	.....	September	December	Koppel
	15	Flat	80,000	41	0	Steel	.....	September	October	Koppel
	5	Caboose	.....	24	0	Steel Frame	.....	November	.....	Am. Car & Fdy.
	*2	Caboose	.....	.....		.....	.....	.....	1930	Company Shops
	*1	Stock	.....	.....		.....	.....	.....	1930	Company Shops
National Rys. of Mexico	*151	.....	.....	.....		.....	.....	.....	1930	Company Shops
Pan.-Amer. Pet. Co.	10	Tank	9,725g.	34	10	Steel	56,000	October	Jan. '31	Standard Steel
South African Rys.	1	Ore	80,000	28	0	Steel	36,000	June	September	Standard Steel
Standard Oil of N. J.	4	Tank	6,000g.	.....		Steel	.....	April	August	Koppel
United Fruit Co.	25	Banana	.....	.....		.....	.....	June	.....	Magor
United Sugar Cos., S. A.	10	Cane	80,000	47	1½	Steel	41,000	June	September	Standard Steel
Usina Santa Thereginba, S. A.	40	Cane	40,000	.....		Steel	.....	March	July	Koppel
	6	Box	50,000	.....		Steel	.....	March	July	Koppel

* Not included in totals

Canada

Purchaser	No.	Class	Capacity	Length Ft.	In.	Construction	Weight	Date of Order	Date of Delivery	Builder
Canadian National	75	Box	100,000	40	6	Steel Frame	44,600	Dec. '29	May	National Steel
	5	Flat	140,000	41	8	Steel	57,900	Dec. '29	February	Can. Car & Fdy.
	201	Refrigerator	.....	.....		.....	.....	.....	1930	Company Shops
	500	Refrigerator	.....	.....		.....	.....	December	.....	Company Shops
Canadian Pacific	250	Coal	150,000	41	6	St. Und'frame	57,700	February	May	Can. Car & Fdy.
	250	Refrigerator	60,000	40	0	St. Und'frame	62,400	February	June	National Steel
	150	Ore	160,000	27	6	Steel	49,500	May	July	Can. Car & Fdy.
	50	Ore	160,000	23	9	Steel	50,900	April	August	Eastern Car
	5	Flat	266,000	54	5	Steel	106,800	August	October	Company Shops
	250	Refrigerator	.....	.....		.....	.....	December	1931	National Steel
	100	Flat	.....	46	0	.....	.....	December	1931	Eastern Car
	35	Air Dump	30cu.yd.	.....		.....	.....	December	1931	Can. Car & Fdy.
	40	Gondola	150,000	.....		.....	.....	December	1931	Can. Car & Fdy.
	25	Tank	.....	.....		.....	.....	December	1931	Company Shops

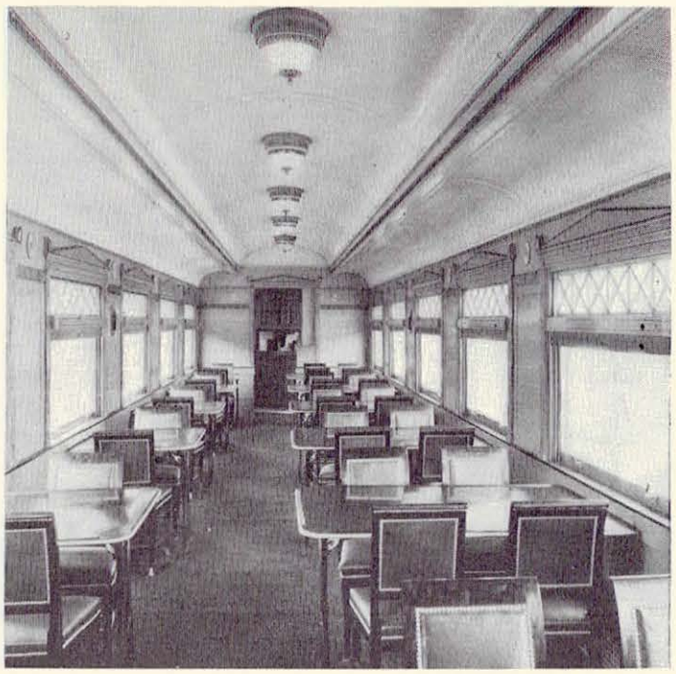
Pacific Fruit Express Refrigerator Car—Built by American Car & Foundry Company

The 1930 Passenger Car Orders

Only 667 cars ordered for domestic use, making 1930 poorest year since 1921—Canadian orders increase from 1929

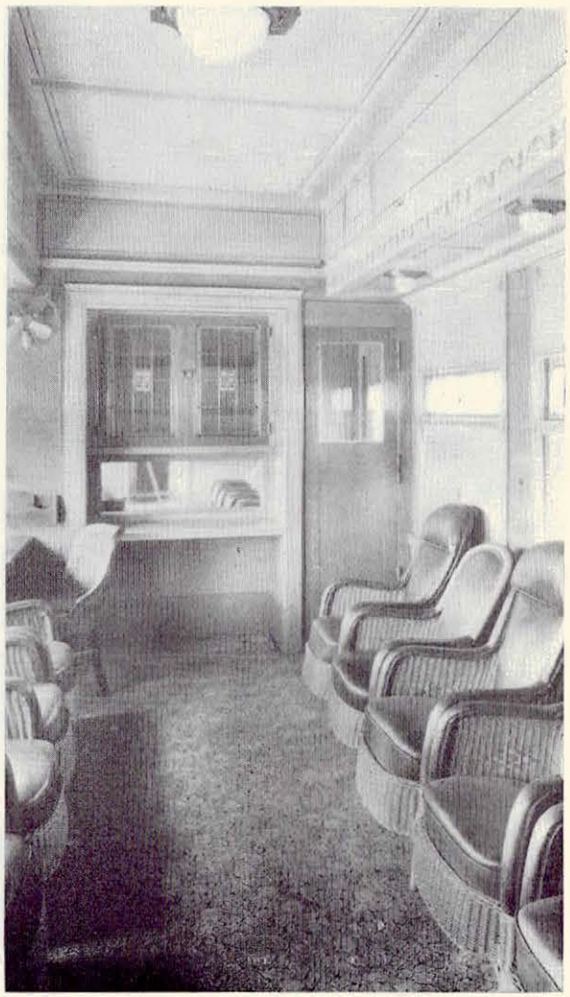
By Gardner C. Hudson

Associate Editor, Railway Age



Atchison, Topeka & Santa Fe Dining Car Equipped for Conditioning the Air

Buffet-Library Car Built Last Year for the Santa Fe



ORDERS placed during 1930 by the railroads of the United States for passenger train cars, exclusive of rail motor cars, which are considered in a separate article, totaled 667—somewhat more than one-fourth the 2,303 cars purchased in 1929, and less than the number ordered in any other year since the post-war depression of 1921. Continued loss of passenger traffic and the current general depression in all lines of industry combined to force a drastic curtailment in the buying of this class of railway equipment, with the result that 1930 ranks as the fourth poorest year in this respect since 1901. Only in 1918, 1919 and 1921 have passenger train car orders been less than in 1930, and only in these four years has the total number of cars ordered been less than 1,000.

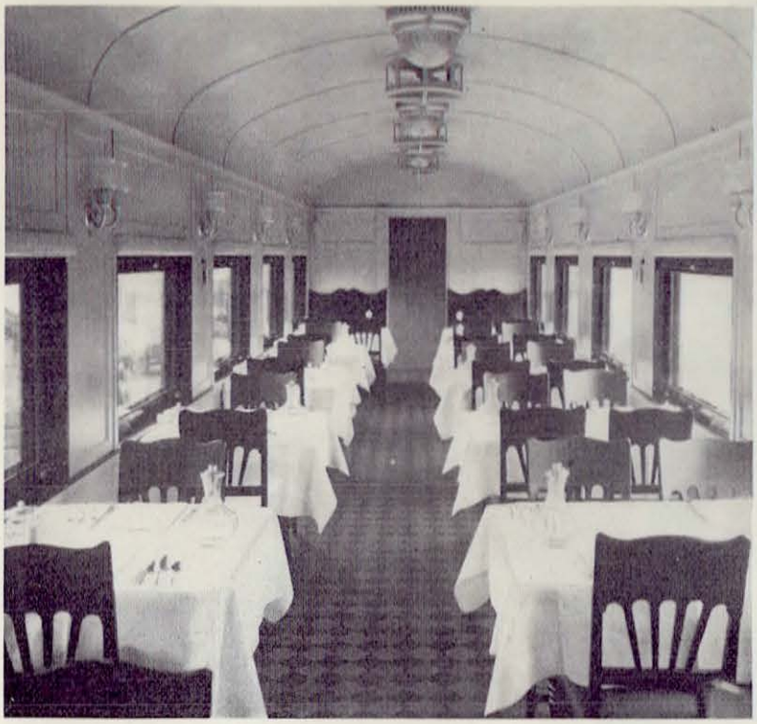
Table I—Passenger Car Orders of 1930

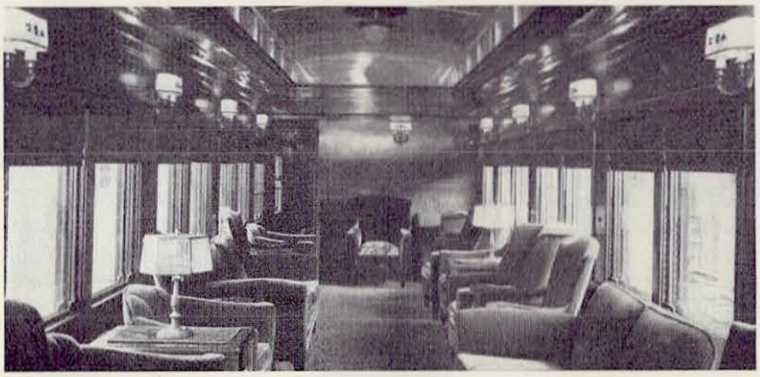
For service in the United States	667
For service in Canada	203
For export to other countries	15
Grand total	885

In contrast to the figures given above, 203 passenger train cars were ordered during the year by Canadian roads for use in Canada. This figure, although exceeded five times since 1918, and by no means a record, is much larger than the 122 cars ordered in Canada last year, and is also well above the average orders for the 12 years from 1918 to 1929, inclusive. For the second successive year the Canadian Pacific was the largest buyer.

Passenger cars ordered in the United States for export use in 1930 numbered 15, less than half the 33 ordered in 1929, and below the corresponding figure for any other year since 1915, with the exception of 1923.

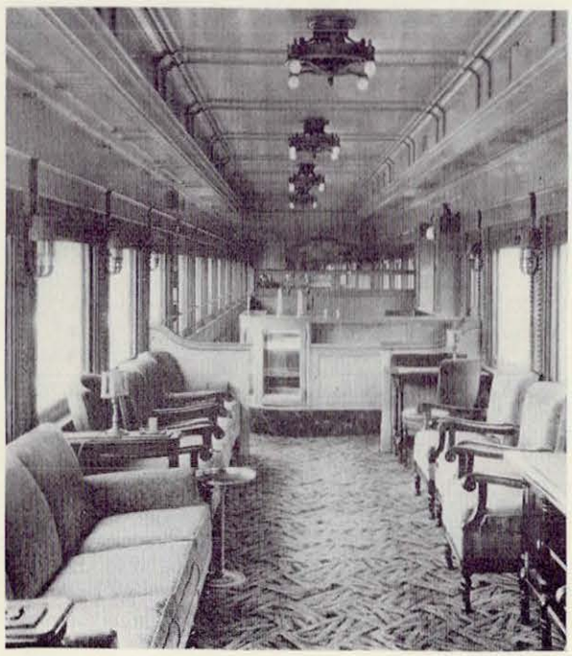
The year's largest group of orders was placed, as in





Some Examples of Interiors of Passenger Cars Built in 1930—Top: Delaware & Hudson Dining Car—Center: Baltimore & Ohio Lounge Car

Below: Missouri Pacific Coach—Right: Southern Pacific Lounge Car



the case of freight cars and locomotives, by three Van Sweringen lines, which ordered a total of 131 cars—71 for the Chesapeake & Ohio, 40 for the Erie and 20 for the Pere Marquette. The other principal buyers were the Pullman Company, 94, including 60 sleeping cars; the Reading, 80, including 70 multiple unit cars; the New York Central, 50 milk and 10 dining cars, and the Long Island, 45 multiple unit cars.

From the viewpoint of passenger car orders, the first quarter was easily the best period of the year. Rising from 58 in January and 134 in February to the year's peak of 169 in March, orders for the first three months totaled 361, or nearly half of all the cars purchased in the entire twelve months. April and May orders stood at 70 and 72, respectively, but September was the only other month in which more than 35 passenger cars were ordered.

The number of passenger train cars built during 1930 for domestic service in the United States was 1,264, almost the same as the production figure for 1929, but slightly below the corresponding totals for other years since 1922. Construction of 40 passenger cars for export from this country doubled the 1929 export production figure of 20 cars; while Canadian production, of cars for use in Canada, totaled 210, and exceeded by a wide margin the 162 cars built for the same purpose in 1929. As in the case of other equipment statistics, it is necessary to bear in mind the difference between figures showing cars ordered and those showing cars built.

The list of orders which follows has been tabulated in the usual manner, railroad reports being checked against and enlarged from lists of orders supplied by car builders, largely through the courtesy of the American Railway Car Institute, and from reports of orders published weekly in the Equipment and Supplies column of the *Railway Age*. Except where otherwise noted, construction is assumed to be all-steel.

Table II—Orders for Passenger Cars Since 1901

Domestic Orders Only

Year	Passenger cars	Year	Passenger cars
1901	2,879	1909	4,514
1902	3,459	1910	3,881
1903	2,310	1911	2,623
1904	2,213	1912	3,642
1905	3,289	1913	3,124
1906	3,402	1914	1,674
1907	1,791	1915	1,978
1908	1,319		

Domestic and Foreign

Year	Domestic	Canadian	Export	Total
1916	2,302	...	109	2,411
1917	1,124	...	43	1,167
1918	9	22	26	57
1919	292	347	143	782
1920	1,781	275	38	2,094
1921	246	91	155	492
1922	2,382	87	19	2,488
1923	2,214	263	6	2,483
1924	2,554	100	25	2,679
1925	2,191	50	76	2,317
1926	1,868	236	58	2,162
1927	1,612	143	48	1,803
1928	1,930	334	29	2,293
1929	2,303	122	33	2,458
1930	667	203	15	885

Table III—Passenger Cars Built in 1930

	United States	Canada	Total
Domestic	1,264	210	1,474
Foreign	40	...	40
	1,304	210	1,514

Comparison with Previous Years

Year	Domestic	Foreign	Total
1899	1,201	104	1,305
1900	1,515	121	1,636
1901	1,949	106	2,055
1902	From 1902 to 1907		1,948
1903	passenger car figures		2,007
1904	in these two columns		2,144
1905*	included in corre-		2,551
1906*	sponding freight car		3,167
1907*	columns.		5,457
1908*	1,645	71	1,716
1909*	2,698	151	2,849
1910*	4,136	276	4,412
1911*	3,938	308	4,246
1912†	2,822	238	3,060

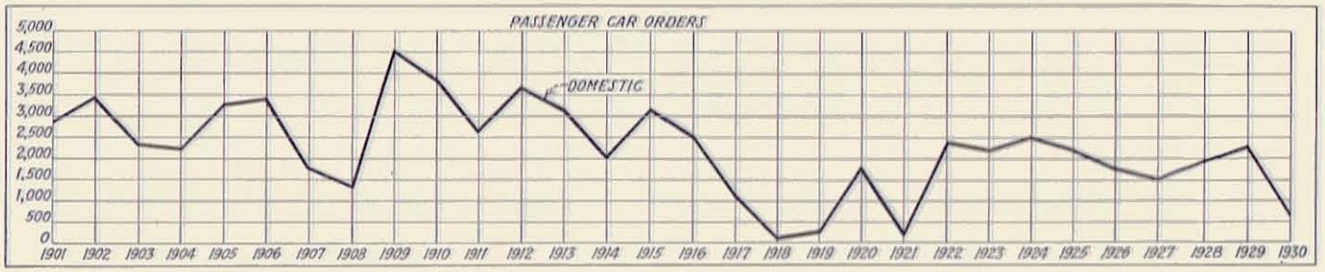
* Includes Canadian output.
† Includes Canadian output and equipment built in company shops.

	United States			Canadian			Grand
Year	Domestic	Foreign	Total	Domestic	Foreign	Total	total
1913	2,559	220	2,779	517	....	517	3,296
1914	3,310	56	3,366	325	....	325	3,691
1915	1,852	14	1,866	83	....	83	1,949
1916	1,732	70	1,802	37	....	37	1,839
1917	1,924	31	1,955	45	....	45	2,000
1918	1,480	92	1,572	1	....	1	1,503
1919	306	85	391	160	....	160	551
1920	1,272	168	1,440	....	....	....	....
1921	1,275	39	1,314	361	....	361	1,675
1922	676	144	820	71	....	71	891
1923	1,507	29	1,536	....	....	....	....
1924	2,150	63	2,213	167	....	167	2,380
1925	2,363	50	2,413	....	....	....	....
1926	2,184	102	2,286	285	....	285	2,571
1927	1,785	50	1,835	126	....	126	1,961
1928	1,356	15	1,371	237	....	237	1,608
1929	1,254	20	1,274	162	....	162	1,436
1930	1,264	40	1,304	210	....	210	1,514

Passenger Car Orders in 1930

For Service in the United States

Purchaser	No.	Class	Length Ft.	Length In.	Seating Capacity	Weight	Date of Order	Date of Delivery	Builder
Atchison, Topeka & Santa Fe	10	Horse	82	2	..	170,000	November	1931	Pullman
	2	Cafe-Obs.	76	10⅝	..	.....	December	1931	Pullman
Atlanta & West Point and Western Ry. of Alabama	2	Pass & Bagg.	72	8½	35	135,000	February	June	Company Shops
Atlantic Coast Line	2	Express	.....	.....	..	.....	.....	1930	Company Shops
Bingham, Harry P.	1	Private	84	4¾	..	188,000	1930	.....	Pullman
Boston & Maine	4	Dining	81	1½	36	158,000	July	December	Pullman
	4	Coach	81	5½	68	134,000	July	Jan. '31	Osgood Bradley
	2	Smok.-Bagg.	81	5½	44	134,000	July	Jan. '31	Osgood Bradley
Central of New Jersey	25	Coach	72	5½	86	110,000	April	December	Pressed Steel
	5	Pass. & Bagg.	72	5½	62	110,000	April	December	Pressed Steel
Chesapeake & Ohio	27	Coach	78	6¼	45	142,000	March	November	Pullman
	3	Coach	78	6¼	54	142,000	March	November	Pullman
	11	Coach	78	6¼	64	142,000	March	November	Standard Steel
	4	Coach & Smok.	78	6¼	64	142,000	March	November	Standard Steel
	15	Pass. & Bagg.	76	10¾	40	138,500	March	Jan. '31	Pressed Steel
	5	Pass., B. & M.	76	10¾	36	138,500	March	Jan. '31	St. Louis Car
	6	Mail & Exp.	73	11¼	..	134,000	March	September	Am. Car & Fdy.
Chicago & North Western	4	Chair	82	11½	72	146,500	July	Jan. '31	Pullman
Chicago, Burlington & Quincy	10	Baggage	70	0	..	138,000	March	1930	Company Shops
	14	Coach	78	7	100	107,000	May	1930	Company Shops
Chic., Milwaukee, St. P. & Pac.	1	Dining	85	4	36	183,000	May	.....	Pullman
	1	Dining	85	4	42	183,000	May	.....	Pullman
	8	Mail & Exp.	.....		.	.....	.....	1930	Company Shops
Chicago, Rock Island & Pacific	5	Baggage	70	0	..	134,100	March	July	Am. Car & Fdy.
	10	Coach	74	6	83	146,600	February	August	Pullman
	2	Parlor	74	6	41	154,750	Dec. '29	August	Pullman
	2	Parlor	74	6	42	154,750	Dec. '29	August	Pullman



Passenger Car Orders from 1901 to 1930

Purchaser	No.	Class	Length Ft.	Length In.	Seating Capacity	Weight	Date of Order	Date of Delivery	Builder
Erie	3	Dining	82	7¼	36	171,600	May	July	Pullman
	20	Sub. Coach	75	5⅜	88	104,300	June	Sept.-Oct.	Standard Steel
	3	Bagg. & Mail	73	11¼	..	137,300	June	November	Am. Car & Fdy.
	2	Bagg. & Mail	64	6¾	..	117,300	September	.....	Bethlehem
	7	Coach	79	3¾	60	152,000	July	.....	Pullman
	5	Express	73	5¼	..	131,500	July	.....	Am. Car & Fdy.
Green Bay & Western	3	Mail & Exp.	.....		..	.....	.....	1930	Company Shops
Illinois Terminal	† 2	Room-Cars	57	0	..	87,000	March	August	St. Louis Car
Kewaunee, Green Bay & Western	2	Mail & Bagg.	.....		..	.....	.....	1930	Company Shops
Long Island	25	M. U. Coach	63	11	72	117,000	March	November	Pressed Steel
	20	M. U. Coach	63	11	72	117,000	March	October	Am. Car & Fdy.
Louisville & Nashville	3	Dining	81	8	36	169,000	March	November	Am. Car & Fdy.
	4	Pass. & Bagg.	74	4¾	36	142,400	March	November	Am. Car & Fdy.
	4	Pass. & Smok.	77	9¾	78	145,100	March	November	Am. Car & Fdy.
	2	Bagg. & Mail	72	9¾	..	140,200	March	November	Am. Car & Fdy.
	10	Baggage	72	9¾	..	140,000	March	November	Pressed Steel
Maine Central	5	Coach	72	2	68	134,000	July	Jan. '31	Osgood Bradley
	2	Pass. & Bagg.	75	1	44	134,000	July	Jan. '31	Osgood Bradley
Missouri-Kansas-Texas	3	Dining	81	7⅝	36	185,000	May	Feb. '31	Am. Car & Fdy.
Missouri Pacific	2	Lounge	80	0	37	170,300	January	June	Pullman
	5	Coach	70	0	77	154,880	Dec. '29	July	St. Louis Car
	5	Coach	70	0	65	154,880	Dec. '29	July	St. Louis Car
	3	Dining & Club	70	0	38	163,400	Dec. '29	August	Pullman
	2	Dining & Par.	70	0	38	163,400	1929	August	Pullman
New York Central	10	Dining	74	4¾	36	174,300	January	August	Pullman
	50	Milk	52	3⅝	..	85,000	August	Feb. '31	Merch. Despatch
New York, New Haven & Hartford	12	M. U. Coach	79	7¼	120	176,000	January	December	Osgood Bradley
	19	M. U. Trailer	79	7¼	120	103,600	January	December	Osgood Bradley
	2	M. U. Trailer	79	7¼	87	103,600	January	December	Osgood Bradley
	1	Club	84	5½	62	123,000	March	May	Osgood Bradley
Northwestern Pacific	7	M. U. Coach	72	4½	98	110,000	April	November	St. Louis Car
	2	M. U. Trailer	72	4½	103	79,200	April	November	St. Louis Car
Panama Railroad	* 1	Coach	70	0	72	75,600	1930	.....	Company Shops
	* 5	Pass. Serv.	34	2½	..	42,600	1930	.....	Company Shops
Pere Marquette	12	Express	70	8½	..	132,000	January	October	Am. Car & Fdy.
	8	Coach	78	6¼	45	153,300	January	November	Pullman
Pullman Company	60	Sleeping	.....		..	.....	1930	.....	Pullman
	34	Parlor, Observation, Parlor-Obs.	.....		..	.....	1930	.....	Pullman
Reading	10	Baggage	70	0	..	132,100	May	October	Am. Car & Fdy.
	61	M. U. Coach	63	0	86	133,000	April	Mar. '31	Bethlehem
	7	M. U. P. & B.	63	0	62	133,000	April	Mar. '31	Bethlehem
	2	M. U. P., B. & M.	63	0	38	133,000	April	Mar. '31	Bethlehem
Southern Pacific	5	Dining	83	6	36	175,200	March	October	Pullman
	3	Observation	83	6	34	173,000	April	November	Pullman
	1	Lounge	83	6	38	173,000	April	November	Pullman
	10	Baggage	70	0	..	132,200	February	September	Pressed Steel
Texas & Pacific	3	Lounge	83	6	37	170,000	1930	.....	Pullman
Union Pacific	10	Chair	83	0	72	150,000	July	December	Pullman
	10	Baggage	69	0	..	126,000	July	Jan. '31	Pressed Steel
	1	Bagg. & Mail	69	0	..	133,000	July	Jan. '31	Pressed Steel

† Composite
* Not included in totals

Export

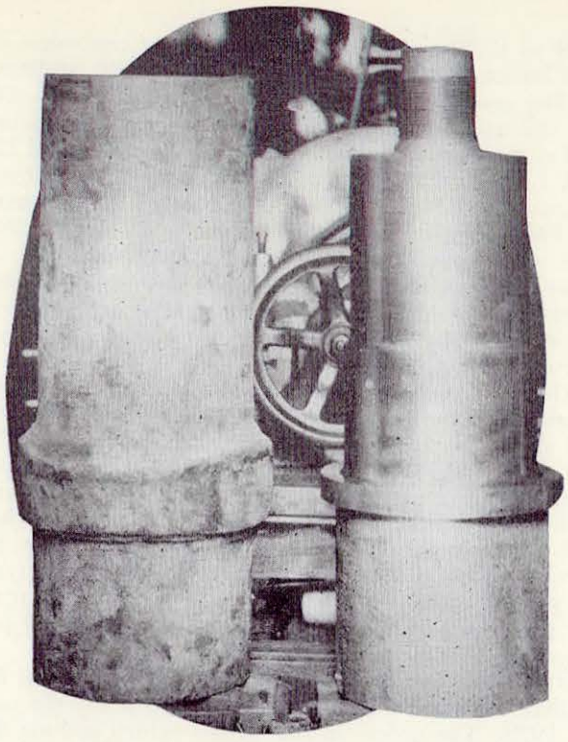
Purchaser	No.	Class	Length Ft.	Length In.	Seating Capacity	Weight	Date of Order	Date of Delivery	Builder
International Rys. of Cent. Am.	5	Coach	50	0	..	40,758	Dec. '29	April	Am. Car & Fdy.
	7	Coach	50	0	..	37,526	Dec. '29	April	Am. Car & Fdy.
	3	Baggage	50	0	..	38,354	Dec. '29	April	Am. Car & Fdy.
National Rys. of Mexico	* 10	.....	.....		..	.....	.....	1930	Company Shops

* Not included in totals

Canada

Purchaser	No.	Class	Length Ft.	Length In.	Seating Capacity	Weight	Date of Order	Date of Delivery	Builder
Canadian National	12	Lounge	84	7½	36	178,000	February	July	Can. Car & Fdy.
	12	Sleeping	84	7½	40	173,300	January	May	Can. Car & Fdy.
	5	Dining	86	10½	36	179,400	January	June	Can. Car & Fdy.
	5	Baggage	60	10½		116,500	April	August	National Steel
Canadian Pacific	50	Sleeping	81	0	60	183,000	January	Feb. '31	Company Shops
	2	Night Sleeper	81	0	..	180,100	February	November	Company Shops
	5	Compartment	81	0	40	186,000	February	August	Company Shops
	14	Parlour	81	0	34	172,600	February	November	Company Shops
	8	Dining	80	7	36	187,600	February	Jan. '31	Company Shops
	7	Smoking	81	0	88	165,800	February	November	Company Shops
	13	Coach	81	0	82	167,800	February	October	Company Shops
	3	Mail, B. & Exp.	80	7	..	159,600	February	July	Can. Car & Fdy.
	10	Baggage	80	7	..	156,000	February	October	National Steel
	15	Sleeping	.....		..	.....	December	1931	Company Shops
	6	Sleeping	.....		..	.....	December	1931	Company Shops
	4	Sleeping	.....		..	.....	December	1931	Company Shops
	10	Coach	.....		..	.....	December	1931	Company Shops
	10	Tourist	.....		..	.....	December	1931	Company Shops
	10	Bagg. & Exp.	.....		..	.....	December	1931	Can. Car & Fdy.
Newfoundland	* 2	Sleeping	61	4	32	90,261	1930	.....	National Steel
	* 1	Dining	56	9	21	85,836	1930	.....	National Steel
Northern Alberta	2	Mail & Exp.	84	7½	..	160,700	May	July	Can. Car & Fdy.

* Not included in totals.



MACHINE TOOLS ORDERED IN 1930

Returns are indicative of the general business depression —Orders for material-handling equipment increase

By W. J. Hargest
Associate Editor, Railway Age

DURING the past year there was a marked decline in the purchase of all classes of machine tools and shop equipment, with the exception of material-handling equipment. The 84 roads reporting their purchases represent 88 per cent of the total route mileage of the North American Continent, the remaining 12 per cent including three large systems.

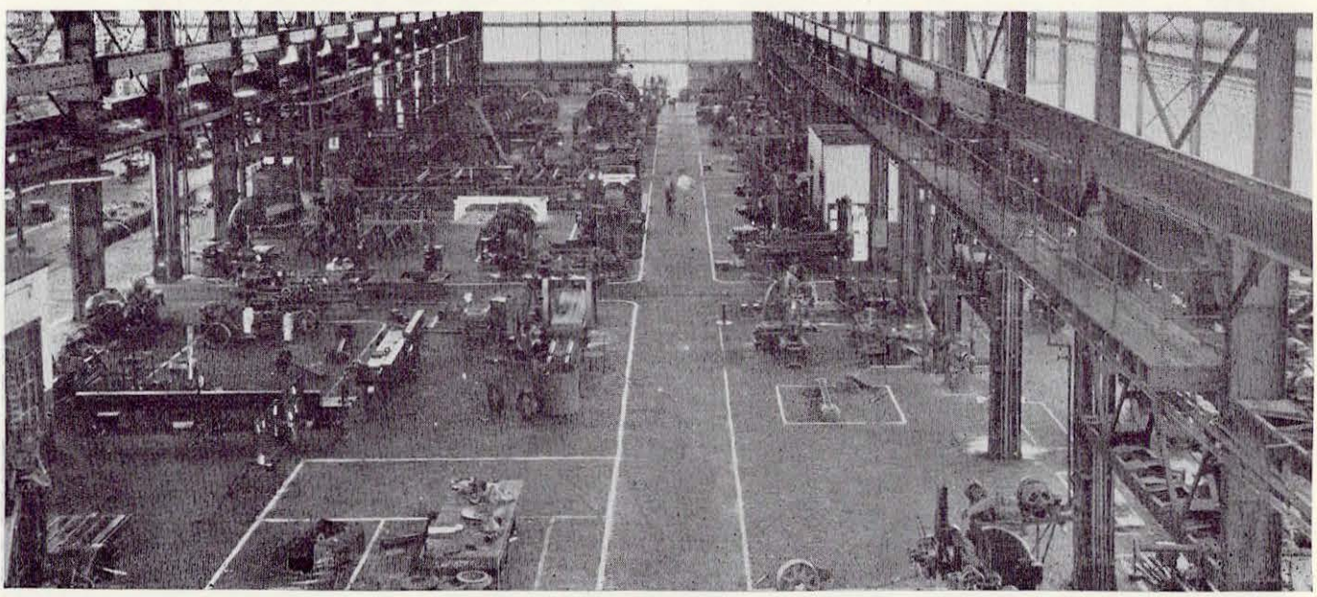
The 84 railroads reported the purchase of 2,316 units which is a decrease of 374 from the orders placed the preceding year when 88 railroads, representing 89 per cent of the route mileage of the continent reported. It is also a decrease of 61 units under the purchases of 1928 when 87 railroads, representing 85 per cent of the route mileage, placed orders for 2,377 units of this type of equipment. The 2,316 unit purchases last year is an increase of 44 units over the 2,172 units ordered in 1927 by 99 railroads, representing 88 per cent of the total route mileage, and a decrease of 1,141 from the 3,457 units ordered in 1926 by 97 railroads, representing 84 per cent of the total route mileage.

There was a very considerable increase in 1930 over 1929 in the purchase of the group of electric, gas and trailer equipment for the handling of materials. Exclusive of the latter, there was a decrease in 1930 of 949 units in all other machine and equipment groups from the total number purchased during 1929. Specific items of equipment which were purchased in approximately equal or greater quantities in 1930 than in 1929 include wheel lathes, portable boring, facing and drilling equipment, wheel and other types of presses, power hammers, bull-dozers, flue welders, blowers, surfacers and jointers, air hoists, chain hoists, air-brake test racks and motors.

Trend of Seven Years

The table shows the fluctuations of purchases of machine tool and shop equipment over a seven-year period and reveals the extent of the decline in orders placed during 1930 for the various items tabulated. No new shops of large size were equipped during 1930.

Although the 1930 orders for axle, engine and tur-



An Orderly Locomotive Machine Shop

ret lathes fell off practically 39 per cent from the purchases of 1929, 25 axle lathes, 84 engine lathes, and 24 turret lathes were purchased. Orders were placed for 24 wheel lathes as compared with 25 in 1929. The total of 157 compares with 363, 310, 395, 223, 189 and 240 for 1924 to 1929, inclusive. Of these, 60 per cent were engine lathes. During the period 1924 to 1930, inclusive, drilling machines ordered numbered 178, 179, 296, 140, 94, 162 and 66. The total number of planers, shapers and slotters ordered during the same period totaled 127, 104, 121, 77, 60, 83 and 35, the purchases of 1930 representing a decrease of 58 per cent under the purchases of 1929. The purchases of boring mills during 1930 was off 42 per cent from 1929. Milling machines, all types of grinding machines, metal cutting saws, bolt threaders and pipe threaders and cutters also showed a marked decrease in purchases as compared with the preceding year.

Machine Tools and Shop Equipment Purchased Over a Seven-Year Period

	1930	1929	1928	1927	1926	1925	1924
Lathes							
Axles	25	36	28	27	72	47	35
Engine	84	134	115	149	236	178	209
Turret	24	48	38	33	55	51	93
Wheel	24	25	11	14	32	34	26
Drill Presses							
Radial	31	42	31	48	93	65	71
Vertical and others	35	121	63	92	203	114	107
Planers	13	19	12	23	39	25	40
Shapers	20	53	42	46	75	70	74
Slotters	2	11	6	8	7	9	13
Boring Mills							
Horizontal	4	7	8	4	13	13	16
Vertical and others	31	53	46	49	93	56	64
Milling Machines							
Universal	2	4	5	8	26	15	18
Horizontal and others	16	53	24	19	37	23	32
Grinding Machines							
Cylindrical	2	8	13	10	20	9	13
Internal	8	13	27	32	20	36	20
Surface	1	27	10	10	22	14	17
Double end, tool and others	182	258	224	236	346	232	190
Metal cutting saws	28	35	29	31	68	40	36
Portable boring, facing and turning machines	29	30	34	29	80	58	51
Bolt threaders and cutters	13	43	27	30	54	53	54
Pipe cutters and threaders	22	50	35	45	66	40	42
Presses							
Wheel	20	13	4	17	24	22	20
Others	30	33	50	42	74	60	58
Hammers							
Steam	7	8	18	12	37	34	19
Other power	13	15	21	18	24	10	12
Forging Machines							
Bulldozers	4	5	2	9	5	6	11
Others	3	20	3	5	20	6	12
Punches	3	10	10	4	30	15	13
Shears	18	36	42	23	72	31	41
Combination Punch and shear	8	16	16	20	39	33	22
Flue Shop Machinery							
Flue welders	5	7	9	12	16	7	22
Miscellaneous	4	20	14	24	11	19	32
Boiler Shop Machinery							
Flangers	1	6	9	4	17	21	17
Forming rolls	3	12	9	9	14	9	12
Riveters	12	37	7	5	15	8	..
Blowers	37	40	53	37	100	97	..
Furnaces							
Oil	32	52	64	53	68	63	..
Electric and others	27	118	43	27	18	96	..
Woodworking Machinery							
Boring machines	4	15	11	12	9	8	10
Mortisers	5	15	9	11	21	16	13
Surfacers and jointers	23	16	18	15	43	17	17
Tenoners	4	13	7	5	11	11	12
Wood cutting saws	19	31	33	57	93	64	62
Others	25	40	32	24	39	44	32
Overhead cranes	17	81	39	32	50	23	..
Car and loco. hoists and drop tables	40	65	60	63	24	14	..
Hoists							
Air	84	66	75	53	116	101	.
Electric	82	177	44	56	54	51	..
Chain	34	30	42	85	41	78	..
Trucks							
Electric	71	64	90	55	98	114	..
Gas	66	126	65	33	76	17	..
Trailers	785	157	395	132	135	85	..
Air-brake test racks	11	10	30	43	28	24	..
Air compressors	39	66	52	64	82	54	..
Motors	115	124	101	122	138	27	..
Electric welders	69	96	72	46	158	110	..

The total number of orders for presses, hammers, forging machines, punches, shears and combination punch and shears placed during the past seven years were 208, 215, 325, 150, 126, and 106, respectively. This represents a decrease of 16 per cent for 1930 as compared with the purchases of 1929. The purchases of wheel and other types of presses exceeded by four the purchases of 1929. The orders for various types of power hammers fell off slightly from the number purchased during the preceding year, the 1930 purchases totaling 20, while those of 1929 totaled 23.

Of the flue and boiler-shop equipment orders, the flue welders were the only ones which approached the total for 1929. The orders in this group, which include flue welders, miscellaneous flue shop machinery, flangers and forming rolls, totaled 13, which represents a decrease of 71 per cent from the purchases of 1929. In the orders placed for riveters, oil furnaces and electric furnaces, there was a decrease of 67, 38, and 77 per cent, respectively. The orders for woodworking machinery placed during 1930 were off 43 per cent as compared with 1929. During the past seven years, beginning with 1924, the railroads ordered 146, 60, 216, 124, 110, 130, and 80 units, respectively, of this type of equipment, which includes bores, mortissers, surfacers, tenoners, and saws. Of this group, the purchases of surfacers and jointers were the only ones to exceed the purchases of the preceding year.

Material-Handling Equipment

During the past year there was an increase in the purchases of air and chain hoists, but a decrease in the purchases of electric hoists. The only other group of equipment which showed a marked increase in purchases during 1930 was that of electric trucks, gas trucks, and trailers, although individually the orders placed for gas trucks during 1930 was 48 per cent less than the orders placed in 1929. The orders placed for this type of equipment as a group, however, represent an increase of 165 per cent over the orders placed in 1929.

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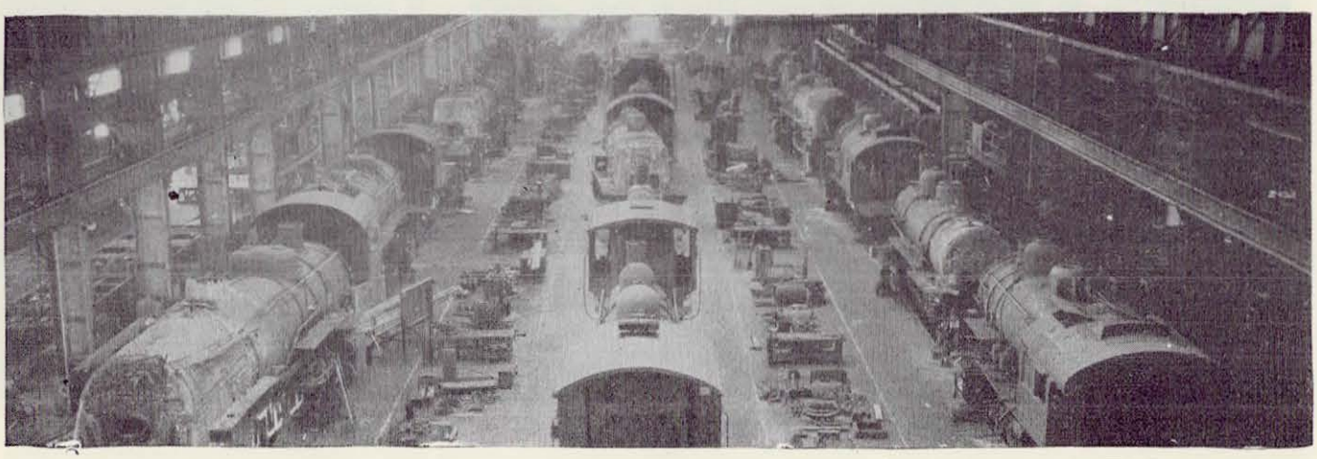
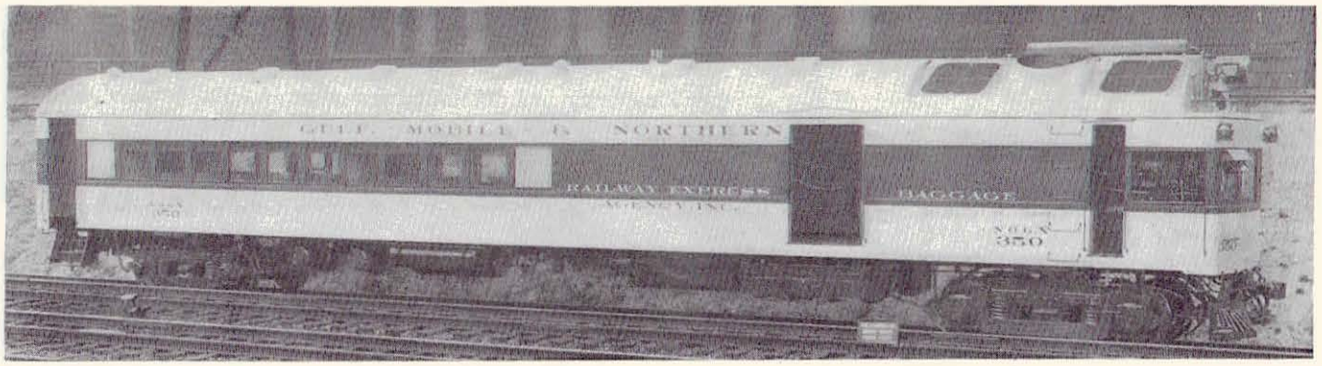




Gulf, Mobile & Northern Gas-Electric Rail Motor Car Model 860 with Single Power Plant of 550-Hp. Built by the J. G. Brill Company

Orders for Rail Motor Cars Reflect Business Depression

Power plants of 600 hp. capacity installed in several cars—Electric transmission used on all cars for public service roads

By C. B. Peck

Mechanical Department Editor, Railway Age

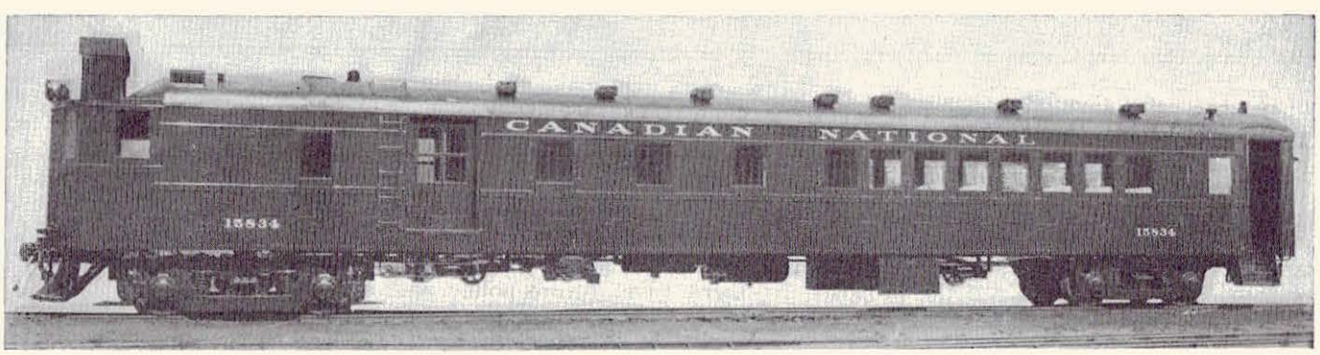
ORDERS for 56 rail motor cars and 11 trailers were placed with the builders in the United States and Canada in 1930. As is the case with other types of equipment, this marks a decided recession in the number of motor cars ordered in 1929. During only one year since orders for this class of equipment have been tabulated in the *Railway Age* have fewer cars been purchased. In 1922, the first year for which these records were kept, 50 motor cars and 9 trailers were ordered. In 1923 the number of motor cars ordered increased to 93, with no increase in the number of trailers. The largest number of motor cars ordered in any year since that time was 176 in 1927, and the 25 trailers ordered in that year also constitute the largest year's business.

Orders for Rail Motor Cars and Trailers

	1922	1923	1924	1925	1926	1927	1928	1929	1930
For service in U. S.	51	77	120	149	142	180	175	132	54
For service in Canada	7	3	12	7	4	9	10	10	8
For export	1	22	..	34	32	12	9	28	3
Total	59	102	132	190	178	201	194	169	65
Motor cars	50	93	112	171	161	176	172	159	56
Trailers	9	9	20	19	17	25	22	11	9

Power Plant Capacity of Rail Motor Cars, U. S. and Canada

Horsepower	1925	1926	1927	1928	1929	1930
100 or less	13	14	2	5	6	2
Over 100 to and including 125	5	7	..	1	3	.
Over 125 to and including 150	9	..	..	4	1	.
Over 150 to and including 175	20	1	..	1	..	.
Over 175 to and including 200	49	3	3	1	..	..
Over 200 to and including 250	36	65	43	13	2	
Over 250 to and including 300	2	26	76	64	15	7
Over 300 to and including 350	..	..	..	30	2	2
Over 350 to and including 400	2	..	..	18	64	25
Over 400 to and including 450	..	8	7	6	2	..
Over 450 to and including 500	..	11	1	4	5	
Over 500	..	..	8	15	30	17
Unclassified	..	..	24	1	2	



Canadian National Oil-Electric Rail Motor Car Built by the Canadian Car & Foundry Company, Ltd.

ness in that type of equipment. The first table shows a comparison of the orders for rail motor cars and trailers placed during the past nine years.

Although the number of cars ordered is relatively small, an analysis of the orders according to power plant capacity and car weights indicates no recession in the trend toward more power and greater weight. In 1928, 27 per cent of the motor cars ordered for service in the United States and Canada had power plants exceeding 350 hp. in capacity. In 1929 over 76 per cent of the cars had power plants rated at over 350 hp. Last year 42 of the 56 cars ordered, or 75 per cent of the total, were rated at over 350 hp., and 17 of the 42 were rated at over 500 hp. The weights of 29 of the cars fell between 125,000 and 150,000 lb. and of 13 of the cars between 150,000 and 175,000 lb. Two of the tables show the distribution of the motor cars by power-plant capacity and weight, respectively, since 1925.

All of the cars ordered for public service railways in the United States and Canada are equipped with either gas-electric or oil-electric power plants. In the United States an order for one oil-electric car was placed by the Great Northern and in Canada orders for six were placed by the Canadian National.

The Diesel-engine power plant is demonstrating its capacity and reliability under steam-railway service conditions. Several cars equipped with this type of power plant in Canada have established records of 100 per cent availability over considerable periods and the car ordered by the Great Northern has already found a place for itself handling several trailers under severe winter conditions.

A list of orders for rail motor cars and trailers placed during 1930 follows.

Comparison of Rail Motor Weights, U. S. and Canada

Weights	1925	1926	1927	1928	1929	1930
25,000 and under	6	7	..	3	3	..
Over 25,000 lb. to and including 50,000 lb.	19	7	..	4	6	..
Over 50,000 lb. to and including 75,000 lb.	74	2	4	4	..	2
Over 75,000 lb. to and including 100,000 lb.	27	79	29	16	5	..
Over 100,000 lb. to and including 125,000 lb.	7	32	88	62	20	2
Over 125,000 lb. to and including 150,000 lb.	..	5	21	58	54	29
Over 150,000 lb. to and including 175,000 lb.	..	..	..	11	24	13
Over 175,000 lb.	..	1	..	..	7	..
Unclassified	..	..	26	5	13	7

Orders for Rail Motor Cars and Trailers

For Service in the United States

Purchaser	No.	Motor or Trailer	Type of power plant	Horse-power	Seating capacity	Length of bagg. compt. Ft.	In.	Weight	Builders
Brill Co., J. G.	5	Motor	Gas-Electric	400	..	..	..	.....	Co. Shops-G.E.
	1	Motor	Gas-Electric	400	..	..	..	.....	Co. Shops-West.
Chicago, Burlington & Quincy	4	Motor	Gas-Electric	400	..	43	3	139,700	Elec.-M.-Winton-G.E.-Pullman
Cleveland, Cin., Chicago & St. Louis	1	Motor	Gas-Electric	535	..	15	0	155,000	Brill-G.E.
Erie	6	Motor	Gas-Electric	600	54	13	4	160,000	Elec.-M.-Winton-G.E.-Bethle'm
	5	Motor	Gas-Electric	600	54	13	4	160,000	Elec.-M.-West.-Bethlehem
Great Northern	1	Motor	Gas-Electric	400	..	26	0	144,500	Elec.-M.-Winton-G.E.-St. Louis
	1	Motor	Oil-Electric	400	..	41	0	147,780	West.-St. Louis
	1	Motor	Gas-Electric	400	..	31	10	141,390	Brill-G.E.
Lehigh Valley	1	Motor	Gas-Electric	600	42	17	1	154,200	Elec.-M.-Winton-G.E.-Osgood Bradley
	1	Motor	Gas-Electric	600	18	34	7	152,300	Elec.-M.-Winton-G.E.-Osgood Bradley
	1	Trailer	.....	...	84	.....		76,700	Osgood Bradley
Minneapolis & St. Louis	4	Motor	Gas-Electric	400	..	29	1	146,250	Elec.-M.-Winton-G.E.-St. Louis
New Orleans Great Northern	2	Motor	Gas-Electric	535	40	19	5	140,000	Brill-G.E.
	1	Trailer	.....	...	52	28	0	78,800	J. G. Brill
	2	Trailer	.....	...	80	.....		81,500	J. G. Brill
	1	Trailer	.....	...	66	.....		77,860	J. G. Brill
New York Central	1	Motor	Gas-Electric	300	Sperry Detector Car			136,600	Brill-Hall-Scott-G.E.
Oregon Short Line	2	Motor	Gas-Electric	300	50	.....		114,600	Brill-Hall-Scott-West.
	2	Trailer	.....	...	..	54	6	76,700	Pullman
Pennsylvania	5	Motor	Gas-Electric	400	66	16	6½	139,400	Brill-G. E.
Reading	1	Motor	Gas-Electric	600	..	..	..	.....	Brill-West.
	1	Trailer	.....	...	60	.....		67,390	J. G. Brill
Sperry Development Co.	2	Motor	Gasoline	92	..	.....		50,480	Brill-Cont.
U. S. Government	1	Trailer	.....	...	40	.....		17,460	J. G. Brill
Wichita Valley	1	Motor	Gas-Electric	400	..	43	3	139,400	Elec.-M.-West.-Pullman

Export

Argentine State Rys.	2	Motor	Gasoline	85	52	11	10	31,550	Brill-Hall-Scott
United of Havana	1	Motor	Gasoline	175	53	16	6	55,260	Brill Winton

Canada

Canadian National	2	Motor	Oil-Electric	350	37	27	3	144,000	Nat. St. Car-West.
	2	Motor	Oil-Electric	300	37	24	5	141,200	Nat. St. Car-West.-Co. Shops
	2	Motor	Oil-Electric	300	..	52	10	141,200	Nat. St. Car-West.-Co. Shops
Canadian Pacific	2	Motor	Gas-Electric	400	51	20	2½	139,400	Elec.-M.-Winton-G.E.-St. Louis

Review of Railway Operations

(Continued from page 54)

made little headway in 1930, although some individual carriers took steps toward acquisition of certain companies in line with the plan. In the meantime, the Commission decided to reopen the proposed Northern Pacific-Great Northern merger, after issuing a favorable report.

The railways have made and are making progress toward more effective and economical methods of operation. They are adapting themselves constantly to the newer conditions of competition and cooperation as they develop. This progress will continue. But this is not all. The nation must recognize that its economic welfare in the future depends on a modern and coordinated system of transportation, and that only a long look ahead, and an earnest and intelligent survey of present and future policy with respect to the development of the several agencies of transportation, will preserve the most effective agencies in full vigor, and will enable them adequately to meet the demands for transportation service.

Prices of Railway Equipment

Conference committee indexes show increases in per pound prices, greatest being in passenger cars

By J. G. Lyne

Financial Editor, Railway Age

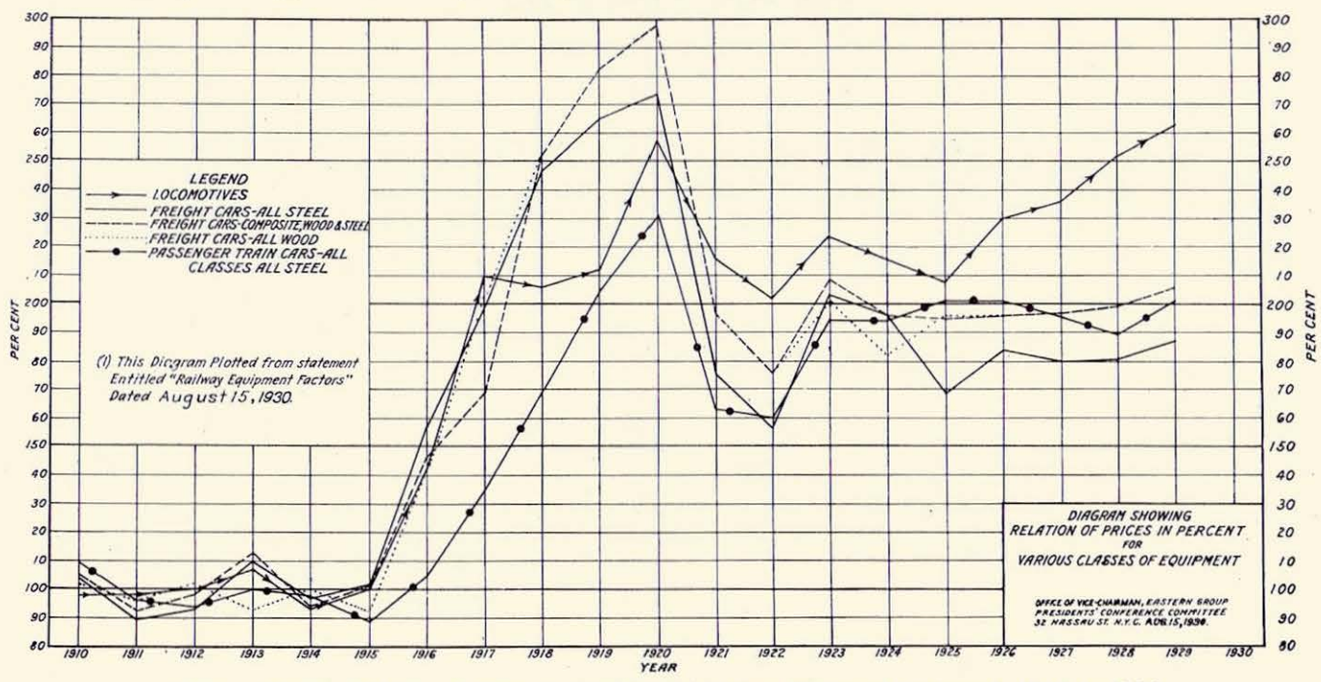
AUTHORITATIVE detailed price averages for cars and locomotives, the compilation of the Eastern group, Presidents' Conference Committee on Federal Valuation, are shown in the accompanying chart and table. This compilation takes price trends up to the end of 1929, and other data are published herewith to permit an estimate of the character of the trend in 1930. The prices compiled by the Conference Committee are supplemented by an index which shows the percentage variation from average prices of 1910-14 taken as 100 per cent. Prices are given per pound and percentages are shown of these prices, rather than upon units of equipment, which of course, vary greatly in size. The data are derived from figures supplied the Conference Committee by two large locomotive builders and six car manufacturing concerns. The tabulation for 1929 shows a material increase in prices per pound for all classes of railway cars and locomotives, the latter showing a rise from 252 per cent of the 1910-14 base in 1928 to 263 per cent of that base in 1929. This increase of 11 points, however, may be compared with the even sharper rise (from 236 to 252) which took place from 1927 to 1928. Locomotive prices per pound rose, therefore, but not so rapidly as in the preceding year.

The percentage price of all-steel freight cars rose from 181 in 1928 to 187 in 1929, and that of freight cars of composite construction from 199 to 206. This presents a contrast to the preceding year when the percentage index of all-steel freight car prices actually declined one point and composite car prices rose but two points.

The greatest relative increase, from a percentage of 189 of the base price in 1928 to 201 in 1929, occurred in all-steel passenger car per pound prices. This also was a reversal of the preceding year's experience, when the index declined to 189 from 196.

The data from which 1930 price trends may be judged are not as complete as those utilized by the Presidents' Conference Committee for 1929 and preceding years. Prices for the year just past are available only by reference to the reports of the Bureau of Finance of the Interstate Commerce Commission on applications of the railroads for authority to issue equipment trust certificates. The railroads, in filing their applications for such authority, are required to list the equipment they propose to purchase and the prices they propose to pay for it—and this information is made a matter of public information by the commission when such applications are acted upon.

There is a definite danger in expecting to determine price trends accurately from these figures. The commission does not describe the equipment in any great detail and an accurate estimate of comparative prices is possible only when detailed information as to the character of the equipment is available. To avoid this difficulty insofar as possible, the *Railway Age* takes the unit prices made public by the commission and endeavors to adduce there-


LEGEND
LOCOMOTIVES
FREIGHT CARS-ALL STEEL
FREIGHT CARS-COMPOSITE, WOOD & STEEL
FREIGHT CARS-ALL WOOD
PASSENGER TRAIN CARS-ALL CLASSES ALL STEEL
(1) This Diagram Plotted from statement Entitled "Railway Equipment Factors" Dated August 15, 1930.
DIAGRAM SHOWING RELATION OF PRICES IN PERCENT FOR VARIOUS CLASSES OF EQUIPMENT
OFFICE OF VICE-CHAIRMAN, EASTERN GROUP PRESIDENTS' CONFERENCE COMMITTEE 32 NASSAU ST. N.Y.C. AUG. 15, 1930.
PER CENT
YEAR
1910 1911 1912 1913 1914 1915 1916 1917 1918 1919 1920 1921 1922 1923 1924 1925 1926 1927 1928 1929 1930

Diagram, Showing Relation of Prices in Per Cent for Various Classes of Equipment, 1910 to 1929

Chart Used by Courtesy of Eastern Group, Presidents' Conference Committee on Federal Valuation

Railway Equipment Factors

STATEMENT

Showing the Number of Units Sold, the Weighted Average Price Per Pound as Sold (Except where Estimated, See Note No. 4) and the Per Cent of Increase in Price

Year or period	Locomotives			Freight Cost: All Steel			Freight Cost: Composite Wood and Steel			Freight Cost: All Wood			All Steel Passenger Train Cars (Steel Underframe and all wood cars —See note 4-d)	
	No. of Locos.	Price per lb.	Per cent	No. of cars	Price per lb.	Per cent	No. of cars	Price per lb.	Per cent	No. of cars	Price per lb.	Per cent	No. of cars	Per cent
1910-1914, incl. base	10,583	7.385c	100	71,108	2.57c	100	148,047	2.51c	100	53,349	2.26c	100	4,116	100
1910	2,901	7.265	98	10,455	2.68	104	18,555	2.63	105	13,739	2.30	102	799	109
1911	1,608	7.255	98	13,850	2.30	89	32,918	2.31	92	13,720	2.17	96	508	96
1912	3,269	7.350	100	17,803	2.39	93	46,348	2.47	98	17,665	2.31	102	821	94
1913	2,066	7.890	107	22,598	2.83	110	25,898	2.84	113	2,600	2.11	93	1,212	100
1914	739	6.873	93	6,402	2.49	97	24,328	2.37	94	5,625	2.25	100	776	98
1915	981	7.413	100	13,050	2.63	102	24,752	2.54	101	4,350	2.11	93	396	89
1916	2,170	10.542	143	21,307	4.01	156	14,650	3.67	146	12,396	3.19	141	687	105
1917	1,586	15.513	210	4,750	5.11	199	14,500	4.25	169	3,200	4.54	201	548	135
1918	1,976	15.225	206	12,383	6.36	247	43,000	6.35	253	None	*5.72*	*253*	16	169
1919	273	15.637	212	None	*6.82*	*265*	None	*7.09*	*282*	None	*6.37*	*282*	31	205
1920	1,458	19.074	258	13,480	7.03	274	12,950	7.47	298	None	*6.73*	*298*	553	231
1921	326	15.923	216	4,200	4.50	175	12,450	4.94	197	None	*4.45*	*197*	47	163
1922	1,910	14.924	202	32,181	4.00	156	26,140	5.24	209	None	*3.96*	*175*	1,182	160
1923	1,726	16.551	224	19,875	5.21	203	51,597	4.39	175	4,800	4.54	201	407	194
1924	1,109	15.919	216	46,433	5.05	196	26,300	4.92	196	3,795	4.12	182	862	194
1925	816	15.326	208	20,776	4.34	169	24,090	4.90	195	600	4.42	196	842	201
1926	960	16.999	230	6,825	4.73	184	15,146	4.93	196	None	*4.43*	*196*	697	201
1927	506	17.415	236	12,150	4.62	180	19,737	4.95	197	None	*4.45*	*197*	877	196
1928	383	18.637	252	10,200	4.66	181	11,735	4.99	199	None	*4.50*	*199*	431	189
1929	742	19.401	263	32,375	4.81	187	32,167	5.16	206	None	*4.66*	*206*	618	201

NOTES—(1) The data on rolling equipment is based on the total selling price of the entire output of two large locomotive and six large car companies with certain sales excluded such as the Pershing locomotives and locomotives and cars sold to foreign countries.

(2) The percentages on floating equipment are based on trend of prices as furnished by five large shipbuilding companies.

(3) The price per pound is a weighted average composite price of all classes of equipment coming under each of the general headings.

(4) All prices and percentages shown in above table were determined from actual data furnished by the manufacturers with the exception of those underlined which were estimated in the following manner:

(a) ALL STEEL FREIGHT CARS. COMPOSITE FREIGHT CARS—Price and percentage for 1919 were derived by interpolating between actual prices reported for 1918 and 1920 (1st 6 mos.).

(b) ALL WOOD FREIGHT CARS—The percentages for composite cars were used and from these percentages the price per pound was calculated using the weighted average price of all wood freight cars for 1910 to 1914, incl., as base, or 100%.

(c) ALL STEEL PASSENGER TRAIN CARS, FLOATING EQUIPMENT—Derived by interpolating between "Trend of Price" factors shown in Equipment Committee's reports (Passenger Train Car Report, dated June 1, 1921, and Supplements, and Floating Equipment Report, dated Dec. 30, 1920, and Supplements).

(d) WOOD WITH STEEL UNDERFRAME AND ALL WOOD PASSENGER TRAIN CARS—No sales reported (except eight for Steel Underframe) 1915 to 1929, incl. If sufficient wooden cars had been sold to make the market, it is felt that the increase in price over the weighted average price 1910 to 1914, incl., would have been at least as great as that for all steel cars; therefore the percentage factors shown for all steel passenger train cars (Col. 15) are recommended for application to the wood with steel underframe and all wood passenger train cars.

Office of Vice Chairman, Eastern Group, Presidents' Conference Committee.

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to such other descriptive information about the locomotives and cars as it is possible to secure from other sources. The commission may mention only the acquisition of a number of freight cars of a certain capacity at a certain price. The *Railway Age* endeavors to secure also the type of construction, date of the order and the

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Locomotive Prices in 1930

(See Explanatory Note in Text)

Road	No.	Type	Weight	Tractive Force	Builder	Unit price	Date of order	Equipment trust series
Central of New Jersey	5	4-6-2	333,800	52,180	Baldwin	$80,888	March	1926
	5	0-8-0	264,600	64,093	Baldwin	57,213	March	1926
Chesapeake & Ohio	40	2-10-4	566,000	106,584	Lima	131,526	January	1930
	50	0-8-0	240,000	57,200	American	58,063	January	1930
	15	0-8-0	240,000	57,200	American	39,560	January	1930
	49	Tenders	.....	.....	American	18,342	January	1930
Chicago Great Western	15	2-10-4	452,000	84,600	Lima	.....	December '29	A
Chicago, Rock Island & Pacific	40	4-8-4	434,000	.....	American	113,035	November '29	Q
	1	0-4-4-0 Oil-elec	257,000	.....	American	119,443	January	Q
					Ingersoll-Rand			
					General Elec.			
					Elec. Storage Battery			
Denver & Rio Grande Western	10	2-8-8-2	738,800	131,800	American	134,010	December '29	...
Erie	10	0-8-0	236,280	57,210	Baldwin	57,072	June	1930
	5	Tenders	20,000 gal	.....	Baldwin	17,715	April	1930
Georgia, Ashburn, Sylvester & Camilla	1	2-8-2	178,740	30,700	Baldwin	35,000	January	1930
Kentucky & Indiana Terminal	4	0-6-0	189,000	44,200	Lima	45,250	November '29	...
	4	0-8-0	220,000	58,000	Lima	48,000	November '29	...
Lehigh & New England	3	0-8-0	269,800	68,500	Baldwin	54,000	September	G
	2	2-10-0	399,200	90,300	Baldwin	82,000	September	G
Missouri Pacific	25	2-8-2	412,200	69,400	Lima	100,330	December '29	
	5	4-8-2	394,000	63,665	American	94,009	December '29	
New York Central	25	4-8-2	.....	.....	American	86,900	June '29	1929
	20	4-6-4	.....	.....	American	90,256	June '29	1929
	5	4-6-4	348,000	42,300	American	89,900	June '29	1929
	5	4-6-4	348,000	42,300	American	89,025	June '29	1929
	5	4-6-4	348,000	42,300	American	89,325	June '29	1929
	10	2-8-4	396,100	81,400	Lima	104,100	February	1930
	5	4-6-4	356,500	55,320	American	90,600	February	1930
	6	Switch	.....	.....	.....	119,350	.....	1930
Pere Marquette	15	0-8-0	240,000	57,200	American	56,322	January	1930
Reading	10	Tenders	.....	.....	Baldwin	20,300	July	M
St. Louis-San Francisco	20	2-8-2	375,790	81,500	Baldwin	108,119	November '29	DD
St. Louis-South Western	10	4-8-4	425,000	61,500	Baldwin	109,158	January	K
Seaboard Air Line	8	2-10-0	.....	.....	Baldwin	43,149	December '29	DD
Southern Pacific	25	4-8-8-2	.....	.....	Baldwin	139,418	December '29	M
	14	4-8-4	.....	.....	Baldwin	114,680	December '29	M
	14	Tenders	.....	.....	.....	13,500	.....	M

Freight Car Prices in 1930

(See Explanatory Note in Text)

Road	No.	Type	Capacity	Construction	Builder	Unit price	Date of Order	Equipment Trust Series
Central of New Jersey	100	Gondola	140,000	Steel	Bethlehem	$3,062	August '29	1926
	100	Gondola	140,000	Steel	Bethlehem	2,952	August '29	1926
Chesapeake & Ohio	500	Box	100,000	S.S. Steel	Pressed Steel	2,727	February	1930
	1500	Box	100,000	Steel	Standard Steel	2,439	February	1930
	3000	Gondolas	100,000	Steel	Amer. Car & Fdy.	1,930	February	1930
	1500	Hopper	140,000	Steel	Richmond Car	2,547	February	1930
Chicago & North Western	500	Flat	100,000	St. Und'frame	Amer. Car & Fdy.	1,918	Oct. '29	1929
Chicago, St. Paul, Minn. & Omaha	100	Gondola	100,000	Steel		2,366		H
Chicago, Milwaukee, St. Paul & Pacific	250	Gondola	140,000	St. Fr. & Und'frame	Bettendorf	2,593	January	L
	250	Gondola	140,000	St. Fr. & Und'frame	Bettendorf	2,628	January	L
	500	Gondola	140,000	St. Fr. & Und'frame	Pressed Steel	2,693	February	L
	500	Box	100,000	St. Fr. & Und'frame	Amer. Car & Fdy.	2,348	January	L
	200	Box	100,000	St. Fr. & Und'frame	Pacific Car & Fdy.	2,372	February	L
	300	Flat	100,000	St. Fr. & Und'frame	Ryan Car	1,851	February	L
	300	Flat	100,000	St. Fr. & Und'frame	Pullman	1,879	1930	L
Chicago, Milwaukee, St. Paul & Pacific	83	Ore	100,000	Steel		2,239		K
	1000	Gondola	100,000		{Pressed Steel} {Bettendorf}		September	K
Chicago, Rock Island & Pacific	1000	Box	50-ton	St. Und'frame	Amer. Car & Fdy.	2,483	December '29	Q
	500	Box	50-ton	St. Und'frame	Gen. Amer. Car	2,486	December '29	Q
	500	Box	50-ton	St. Und'frame	Pullman	2,485	December '29	Q
	1000	Auto	40-ton	St. Und'frame	Bettendorf	2,754	December '29	Q
	500	Auto	40-ton	St. Und'frame	Standard Steel	3,074	December '29	Q
	1000	Coal	70-ton	St. Und'frame	Pressed Steel	2,930	December '29	Q
	250	Stock	40-ton	St. Und'frame	Ryan Car	2,195	December '29	Q
	250	Flat	50-ton	St. Und'frame	Ryan Car	1,899	December '29	Q
	50	Caboose		Steel		3,500	December '29	Q
	20	Side-Dump		Steel		2,400		Q
Erie	450	Gondola	140,000	Steel	Greenville Steel Car	2,581	June	1930
	50	Gondola	140,000	Steel	Pressed Steel	3,400	June	1930
	800	Hopper	140,000	Steel	Standard Steel	2,485	June	1930
	150	Hopper	140,000	Steel	Amer. Car & Fdy.	3,250	June	1930
	500	Box	100,000	St. & St. Und'frame	Amer. Car & Fdy.	2,513	June	1930
	200	Auto	80,000	St. & St. Und'frame	Amer. Car & Fdy.	2,760	June	1930
	100	Auto	80,000	St. & St. Und'frame	Pressed Steel	2,911	June	1930
	100	Auto-Furn.	80,000	St. & St. Und'frame	Pressed Steel	3,382	June	1930
Lehigh & New England	300	Box	100,000	All-Steel	Magor	1,980	September	G
	5	Caboose		St. Und'frame	Magor	3,000	September	G
Missouri Pacific	625	Box	100,000	St. Und'frame	Amer. Car & Fdy.	2,340	December '29	..
	625	Box	100,000	St. Und'frame	Mt. Vernon Car	2,344	December '29	..
	700	Hopper	140,000	Steel	Standard Steel	2,580	December '29	..
	300	Hopper	140,000	Steel	Standard Steel	2,444	December '29	..
	35	Caboose		St. Und'frame	Amer. Car & Fdy.	2,918	December '29	..
	20	Caboose	60,000	St. Und'frame	St. Louis Car	4,538	February	..
New Orleans Great Northern	200	Gondola	100,000	St. Und'frame	Company Shops	2,000		..
New York Central	1000	Auto	110,000	Steel	Merchants Despatch	2,531	April	1930
New York Central	700	Auto-Box	110,000	Steel	Merchants Despatch	2,492	March '29	1929
N. Y., N. H. & Hartford	95	Caboose		St. Und'frame		2,289		1930
Pere Marquette	250	Auto-Furn.	800,000	Steel	Pressed Steel	3,303	January	1930
	1500	Box	100,000	Steel	Standard Steel	2,434	January	1930
	750	Gondola	100,000	Steel	Ralston Steel Car	2,019	January	1930
Reading	400	Box	100,000	Steel	Pressed Steel	2,382	December '29	M
	400	Box	100,000	Steel	Standard Steel	2,385	December '29	M
	600	Box	100,000	Steel	Amer. Car & Fdy.	2,391	December '29	M
	600	Box	150,000	Steel	Bethlehem	2,354	December '29	M
St. Louis-San Francisco	1500	Box	100,000	St. Und'frame	Amer. Car & Fdy.	2,277	November '29	DD
	1000	Box	100,000	St. Und'frame	Pullman Car	2,279	November '29	DD
	300	Auto	100,000	St. Und'frame	Gen. Amer. Car	3,306	November '29	DD
	700	Gondola	100,000	St. Und'frame	Pullman	1,911	November '29	DD
Seaboard Air Line	1000	Box	100,000	All-Steel	Pullman	2,246	June	DD
	500	Box	100,000	All-Steel	Richmond Car	2,311	June	DD
	500	Box	100,000	All-Steel	Richmond Car	2,304	June	DD
Southern Pacific	100	Gondola	100,000	Steel	Ralston	2,356	January	M
	298	Auto	100,000	Steel	Pressed Steel	3,337	January	M

Passenger Car Prices in 1930*

(See Explanatory Note in Text)

Road	No.	Class	Length	Weight	Builder	Unit Price	Date of order	Equipment trust series
Central of New Jersey	25	Coach	72 5½	110,000	Pressed Steel	$27,765	April	1926
	5	Pass.-Bagg.	72 5½	110,000	Pressed Steel	27,138	April	1926
Chesapeake & Ohio	15	Pass.-Bagg.	76 10¾	138,500	Pressed Steel	26,561	March	1930
	5	Pass.-Bagg.-Mail	76 10¾	138,500	St. Louis Car	29,513	March	1930
	30	Coach	78 6¼	142,000	Pullman	33,714	March	1930
	11	Coach	78 6¼	142,000	Standard Steel	35,161	March	1930
	4	Coach & Smoker	78 6¼	142,000	Standard Steel	34,683	March	1930
	6	Mail-Exp.	73 11¼	134,000	Amer. Car & Fdy.	24,342	March	1930
Chicago & North Western	5	Bagg.-Pass.	76 7	139,700	Pullman	26,450	April '29	1929
	4	Pass.-Bagg.-Suburban	82 11½	146,500	Pullman	24,200	July '29	1929
	24	Suburban	84 6½	97,800	Standard Steel	34,683	June '29	1929
	5	Horse	74 2¼	143,000	Amer. Car & Fdy.	27,950	July '29	1929
Chicago, Milwaukee, St. Paul & Pacific	2	Dining	85 4	183,000	Pullman	74,500	1930	L
Chicago, Rock Island & Pacific	10	Coach	74 6	146,600	Pullman	28,553	February	Q
	4	Parlor	74 6	154,750	Pullman	50,228	December '29	Q
	5	Baggage	70 0	134,100	Amer. Car	19,856	March	Q
Erie	7	Coach	79 3¼	152,000	Pullman	33,000	July	1930
	20	Suburban	75 5⅝	104,300	Standard Steel	18,917	June	1930
	3	Bagg.-Mail	75 11¼	137,300	Amer. Car & Fdy.	26,500	June	1930
	2	Bagg.-Mail	64 6¾	117,300	Bethlehem	25,500	September	1930
	10	Rail-Motor			Bethlehem	78,000	May	1930
Long Island	25	M. U. Coach	63 11	117,000	{Pressed Steel}	38,936	March	J
	20	M. U. Coach	63 11	117,000	{Amer. Car & Fdy}	38,979	March	J
Missouri Pacific	5	Coach	76	154,880	St. Louis Car	30,697	December '28	
	5	Coach	76	154,880	St. Louis Car	30,108	December '28	
	3	Dining-Club	70	163,400	Pullman	50,598	December '29	
	2	Dining-Parlor	70	163,400	Pullman	50,598	1929	
	4	Dining-Parlor-Obser.	70		Amer. Car & Fdy.	52,114	December '29	
	2	Lounge	80	170,300	Pullman	55,396	January	
New York Central	10	Dining	74 4¾	174,300	Pullman	54,800	January	1930
New York, New Haven & Hartford	70	Coach	84 5¾	125,000	Osgood Bradley	33,250	June '29	1930
	24	Smoking	84 5½	125,000	Osgood Bradley	32,400	June '29	1930
	8	Dining	84 5	170,000	Pullman	62,625	May	1930
	2	Dining	84 5	170,000	Pullman	64,580	August	1930
	10	Bagg.-Mail.	84 3⅛	120,000	Bethlehem	26,565	June	1930

*Including Rail Motor Cars

Road	No.	Class	Length	Weight	Builder	Unit Price	Date of order	Equipment trust series
New York, New Haven & Hartford (Continued)	3	Bagg.-Mail	64 3½	120,000	Bethlehem	26,064	June	1930
	2	Bagg.-Mail	64 3⅛	.....	Bethlehem	26,379	June	1930
	6	Pass.-Bagg.-Smoking	84 5½	124,000	Osgood Bradley	32,308	June	1930
	1	Business	83 8	160,000	Osgood Bradley	75,000	April '29	1930
	1	Club	84 5½	123,000	Osgood Bradley	31,047	June '29	1930
	3	M. U. Motor	.....	.....	.....	61,661	.....	1930
	6	M. U. Trailer	.....	.....	.....	28,502	.....	1930
	20	M. U. Motor	.....	.....	.....	43,473	.....	1930
New Orleans Great Northern	1	Pass.-Bagg.-Trailer	.....	.....	.....	19,253	.....	.....
	1	Coach Obs.-Trailer	.....	.....	.....	20,717	.....	.....
	2	Pass.	.....	.....	.....	20,024	.....	.....
	2	Gas-Elec-Motor	.....	.....	.....	61,215	.....	.....
Reading	10	Baggage	70 0	132,100	Amer. Car & Fdy.	21,255	May	M
St. Louis-San Francisco	3	Dining	.....	.....	Pullman	59,507	December '29	DD
	10	Baggage	70 0	135,000	Amer. Car & Fdy	20,045	November '29	DD
	5	Bagg.-Mail	70 0	138,000	Amer. Car & Fdy.	22,596	November '29	DD
	5	Bagg.-Mail	70 0	138,000	Amer. Car & Fdy.	22,434	November '29	DD
Southern Pacific	7	Observation	83 6	173,000	Pullman	58,031	April	M
	1	Lounge	83 6	173,000	Pullman	57,179	April	M
	5	Dining	83 6	175,200	Pullman	55,428	March	M
	7	Elec.-Motor	.....	.....	.....	36,368	.....	M
	3	Elec.-Trailer	.....	.....	.....	22,983	.....	M
	15	Elec.-Interurban	.....	.....	.....	17,155	.....	M
	10	Baggage	.....	.....	.....	23,484	.....	M

name of the builder so that those interested may seek still further information if they require it.

It is not always possible, however, to identify equipment for which the issue of equipment trust certificates is authorized, with that shown as ordered by the railroads. In such cases the only safe recourse is omission from the tabulation. Moreover price data are not available for equipment purchased by some method of financing other than that of the equipment trust. The tabulation, therefore, cannot be take as completely representative.

If the figures are properly understood, however, and their limitations recognized, they may serve a valuable purpose. They are, for instance, the best source of information available thus early showing price tendencies in 1930. A knowledge of current equipment costs is of important concern to those interested in railroad valuation. Have equipment prices shown the same tendencies as the general price level? If they have varied what have been the reasons?

The *Railway Age*, then, believes that the information properly utilized may serve a useful purpose and, with an added note explanation, proceeds to tabulate it.

Explanatory Note.—Items are given in some descriptive detail so that the varying prices may be reconciled with the different sizes and characteristics of the equipment. It is, of course, impossible to list all the variations, even if the information were available, and some cases will probably be found where equipment of approximately the same published characteristics may be found to be differently priced on different orders. The explanation lies usually in some variation in characteristics which is not mentioned in the tabulation.

Thus, for instance, in the case of two dining cars of approximately the same weight and seating capacity ordered by different railroads at approximately the same time, there might be a material difference in the unit prices. The explanation of this variation might well be a difference in the richness of furnishings or in the elaborateness of kitchen equipment, which contrast would not be shown in the published data.

Finances in 1930

(*Continued from page 74*)

connection with the acquisition of the Hocking Valley.

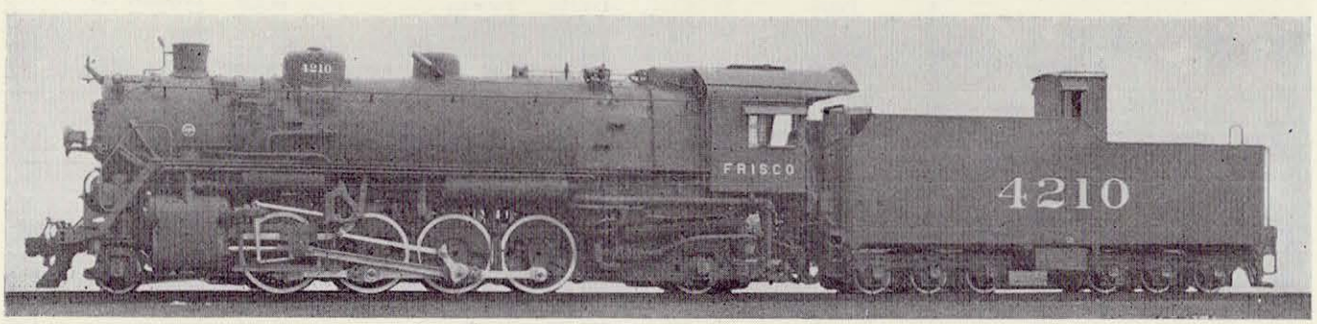
The largest bond issue of the year was $63,031,000 of convertible bonds by the Baltimore & Ohio. Other issues of $50,000,000 or more were placed by the Canadian National and the Pennsylvania. The Chesapeake & Ohio, the Rock Island, the Missouri Pacific, the Nickel Plate and the Southern Pacific, each sold issues ranging from 20 to 50 millions; and there were a large number of smaller issues.

Railroads in the Hands of Receivers

The year 1930 bade fair to close with 3,737 miles of railroad in the hands of receivers (this assuming that the Chicago & Alton is out of the hands of the courts which, technically, it is not yet), or the lowest total since 1905. However, on December 23 receivers were named for the Seaboard Air Line with its 4,490 miles of line, increasing the total mileage in receivership to 8,227, or more than twice what it otherwise would have been.

The sale of the Chicago & Alton under foreclosure to the Baltimore & Ohio on December 11 was the outstanding event in this department of railway activity during the year, while the acquisition of the Savannah & Atlanta by a new company also reduced the mileage in the hands of the courts. The largest company to be placed in receivership during the year, excepting the Seaboard Air Line, was the Waco, Beaumont, Trinity & Sabine.

* * * *



St. Louis-San Francisco 2-8-2 Type Locomotive Built by The Baldwin Locomotive Works

Wider Use of Motor Transport

Railways continue co-ordination of rail and highway facilities—Store-door service gains in popularity

By John C. Emery

Motor Transport Editor, Railway Age

CLOSER attention to the problem of meeting motor vehicle competition for freight traffic and to the solution of this problem were the principal features in the railways' program of increased co-ordination of railway and highway service during 1930. Motor vehicle competition for freight was met by a number of railways with motor truck operation on their own part. Convinced that the store-door collection and delivery of freight offered by competitive truck lines is the basic reason for the popularity of motor truck transportation, a number of railways, particularly in the west and southwest, began to provide service of this sort, and the result was a long step in the direction of complete co-ordination of railway and motor transportation.

Table I.—Growth of Railway Motor Coach Operation

	1925	1926	1927	1928	1929	1930
Number of Railways Operating Motor Coaches	10	25	52	64	78	81
Number of Motor Coaches Operated	300	450	800	1,047	2,389	4,000
Number of Miles of Highway Routes	2,000	6,300	8,000	14,805	40,497	50,000

Along with the increased interest in truck operation came further advances in motor coach operation. Almost without exception those roads which were operating motor coaches previous to 1930 expanded these operations last year. Several railways decided to begin their first motor coach operations during 1930. Finally, the movement toward the acquisition by railways of controlling or substantial interests in large and previously independent motor coach systems continued with increased vigor.

The use of motor coaches and motor trucks by the railways is now so general as to make motor vehicle operation a recognized department of railroading. While there remain a substantial number of railways which are making no use whatever of motor coaches and trucks in the movement of their freight and passengers, this number is diminishing. Motor transportation has become more stabilized due to the increased railway participation in it, making it possible for railways to draw upon the experience of other roads for data on which to base their own conclusions as to the results they might secure through motor vehicle operation.

A picture of the development of railway motor transport during the past six years is presented in statistical form in Tables I and II. Table I—Growth of Railway Motor Coach Operation—shows that the number of railways operating motor coaches increased from 10 in 1925 to 81 in 1930. The number of motor coaches operated increased from 300 in 1925 to an estimated 4,000 in 1930, this being the number operated not only by railway subsidiaries but by companies in which railways hold a controlling or substantial interest. The number of miles of motor coach routes increased from 2,000 in 1925 to 50,000 in 1930. Table II—Growth of Railway Motor Truck Operation—indicates that the number of railways operating motor trucks, tractors and trailers increased from 15 in 1925 to 60 in 1930. The number of motor trucks, tractors and trailers operated increased from 900 in 1925 to 7,000 in 1930.

Motor Coach Developments

With respect to the motor coach field, activities in 1930 centered largely around the consolidation and intensive development of existing lines, rather than the further extension of these lines on a large scale. There are indications that the peak in the development of motor coach transportation will soon be, if it has not already been, reached. The expectation is that the aggregate number of common carrier motor coaches in the country will not increase substantially, at least for several years, while the number of motor coaches operated by railways will increase at a steady rate as additional independent lines are taken over by the railways.

Table II.—Growth of Railway Motor Truck Operation

	1925	1926	1927	1928	1929	1930
Number of Railways Operating Motor Trucks, Tractors and Trailers	15	20	30	45	55	60
Number of Motor Trucks, Tractors and Trailers Operated	900	1,600	3,300	4,900	5,900	7,000

It is interesting to note that the motor coach lines are going through the same experience as the railways with respect to their short-haul passenger traffic. Short-haul passenger traffic of the motor coach lines, both independent and railway, is declining steadily. The effect of this has been a stronger effort on the part of the motor coach lines to develop their long-haul traffic. These efforts have taken form in rate reductions, publication of interline tariffs, and an extensive tightening up of connecting schedules. Efforts have been made from time to time to stabilize motor coach rates, such efforts in several instances having been originated by railways controlling large motor coach systems. These efforts have been rather fruitless, however, owing to the continued existence of many motor coach lines which know no other way to attract traffic than to cut rates.

Whether the motor coach can hold its place as a short-haul carrier in the face of private automobile competition, and whether it can hold its place as a long-haul carrier in spite of railroad competition, is now considered in some quarters to be a matter of grave doubt. The attitude of many railway operators of motor coaches, however, is that the motor coach, as a sensible and relatively economical means of transportation, has and will continue to have an important place in railway transportation as a means of supplementing rail service where this is necessary, and, equally important, as a means of providing necessary common carrier passenger service at the minimum expense.

Motor Truck Developments

Truck operation by the railways was greatly stimulated in 1930 by the increasing competition of independent truck lines, competition which made itself felt not only

in the railways' l.c.l. freight traffic, but also in certain kinds of carload traffic. The trend was and is markedly in the direction of store-door collection and delivery service for railroad freight. The most generally accepted means of providing such service has been through the establishment of a subsidiary company, which acts as an express company, carrying freight from the door of the shipper to the door of the consignee under its own bills of lading, and contracting with the parent railway company for the movement of the freight between stations and with trucking companies for the pick-up and delivery service in terminals. This plan, which was originated by the Southern Pacific, is now in effect on a number of the principal railways in the southwest and west. In other instances, railways have established their own intercity truck lines, operating them in the same manner as those operated by independent trucking companies. The use of motor trucks to replace certain kinds of train service, both in terminals and between terminals, also continued on an expanded basis during 1930.

A Railway Motor Coach Operated Between Denver and Pueblo

Consideration of the Railway Express Agency as a possible means of providing truck service for freight was and is being given close consideration. It has been contended that the Railway Express Agency, which is owned by the railways and which has an established nation-wide truck operating organization for the pick-up and delivery of express traffic, would be a logical operator of trucks for freight handling in terminals, under contracts with the railways. Recently it was reported that railways serving New York are working on a plan to provide for store-door collection and delivery of carload freight in New York with the Railway Express Agency as the trucking medium serving all carriers.

Truck competition has become a matter of vital concern to the railways. In consequence it is expected that the provision of store-door collection and delivery service by the railways, through one medium or another, and the improvement of the railways' freight transportation service in other ways also, will be the means generally adopted by the railways to meet and overcome this competition.

Trucks Operated by the Reading to Replace Train Service

Among the outstanding events of 1930 in the field of railway motor coach operation was the organization of the Pacific Greyhound Lines, in which the Southern Pacific holds a one-third interest. This organization is a consolidation of the principal motor coach companies in the territory of the Southern Pacific's Pacific System, including the motor coach lines of the Southern Pacific subsidiary, the Southern Pacific Motor Transport Company. The Southern Pacific has also acquired a similar interest in the Southland Greyhound Lines operating in Texas.

The Union Pacific and the Chicago & North Western continued the development of their extensive motor coach system, their subsidiary, the Interstate Transit Lines, paralleling the main lines of the Chicago & North Western and the Union Pacific between Chicago, Omaha, Kansas City and the Pacific coast at Los Angeles and Portland, Ore. The Denver & Rio Grande Western further extended its motor coach lines in Colorado and Utah, while the Atchison, Topeka & Santa Fe expanded the scope of its "Indian Detour" highway tours in New Mexico and Arizona.

The New York, New Haven & Hartford effected changes in the organization and management of its subsidiary, the New England Transportation Company, to bring about a more effective co-ordination of the services of the transportation company, the railway and the New Haven's electric railway subsidiaries. The Reading and the Central of New Jersey joined in the establishment of motor coach service between New York and Philadelphia. The Wabash and the Chicago, Indianapolis & Louisville organized subsidiary companies to operate motor coach lines and filed applications for their first operating certificates.

In the field of truck operation, the Texas & Pacific, the Missouri Pacific and the Missouri-Kansas-Texas adopted the plan of providing the store-door collection and delivery service for l.c.l. freight which was originated on the Southern Pacific. The Southern Pacific itself changed the name of its subsidiary to the Pacific Motor Transport Company, and undertook the provision of store-door service extensively along its lines in Oregon, California and Arizona. It also organized another subsidiary, the Southern Pacific Motor Transport

Company, to provide this service in Texas. Similar service was inaugurated by the Spokane, Portland & Seattle, through its subsidiary, the Northwest Freight Transport Company. There were moves and counter-moves in the New York trucking situation and the issue is still undecided, although the most active consideration is now being given to the use of the Railway Express Agency as a medium for the trucking of carload freight in that city.

Regulation an Issue

Regulation of interstate motor coach lines was still an undecided question at the opening of the short session of Congress on December 1. When Congress adjourned last summer, the regulatory bill which had had the support of the railways had been so amended as to make it highly undesirable from the railways' standpoint. Efforts were to be made to have the undesirable features of the amended bill eliminated prior to its final passage.

During the year the Interstate Commerce Commission began an investigation, which is still under way, into the co-ordination of railway and highway service. Hearings have been held in several eastern cities and they will shortly be resumed in the west.

Orders for Motor Vehicles

The railways, together with their subsidiaries and affiliated highway companies, ordered a total of 541 motor coaches, 1,696 motor trucks, 15 tractors, 21 trailers and 51 passenger automobiles during 1930, according to replies received by the *Railway Age* in response to questionnaires seeking these data. The foregoing figures compare with 1929 orders for 390 motor coaches, 1,764 trucks, 59 tractors, 31 trailers and 92 passenger automobiles. The large increase in motor coach orders is due mainly to the inclusion for the first time of orders placed by the several Greyhound Lines which have become affiliated with the railways. These latter ordered 356 of the motor coaches reported, while the Peoples Rapid Transit Company, an affiliate of the Pennsylvania, ordered 22, thus making a total of 378 motor coaches ordered by railway affiliates. The Railway Express Agency, as was the case last year, was the largest purchaser of motor trucks. During the year it ordered 1,597 trucks, nine tractors and three trailers, a total of 1,609 highway vehicles as compared with orders for 1,517 trucks and 43 tractors or a total of 1,560 motor vehicles during 1929.

Statistics of these motor vehicles ordered by railroads are somewhat fragmentary, as was pointed out in similar discussions of prior years. Vehicles ordered by contractors engaged exclusively in railway work are not reported by the railroads. Furthermore, many sales to the railroads are made by local dealers and are therefore not known to manufacturers, who in addition to the railways receive questionnaires designed to collect the accompanying data. Replies to these questionnaires sent to manufacturers are checked with the railway replies in order that the most accurate totals obtainable may be derived.

Orders for Highway Vehicles

Railroad	No.	Type of Vehicle	Model designation	Seating capacity or truck capacity in tons	Purchased by railroad or subsidiary	Where to be used	Manufacturer
Atchison, Topeka & Santa	1	Truck	51A	.....	Railroad	.....	White
	2	M. Coach	Parlor	16	Subsidiary	Rev.	White
	1	M. Coach	Parlor	21	Subsidiary	Rev.	White
	4	M. Coach	Parlor	21	Subsidiary	Rev.	General Motors
	10	Sedan	.....	7	Subsidiary	Rev.	Cadillac
	1	Truck	Tank	1½ ton	Subsidiary	Co. Business	Ford
Boston & Albany	1	Truck	Enclsd. Cab	4 ton	Railroad	Co. Business	General Motors
Boston & Maine	3	M. Coach	Parlor	29	Subsidiary	Rev.	General Motors
	6	M. Coach	Model 99	21	Subsidiary	Rev.	Studebaker
	1	Truck	Model AA	1½ ton	Railroad	Co. Business	Ford
	1	Truck	.....	1½ ton	Railroad	Co. Business	Chevrolet
	1	Roadster	Model A	½ ton	Subsidiary	Co. Business	Ford
	1	Truck	Model AA	1½ ton	Railroad	Co. Business	Ford
	2	Coupe	Model A	.....	Railroad	Co. Business	Ford
	3	Roadster	Model A	.....	Railroad	Co. Business	Ford
	1	Sedan	Model A	.....	Railroad	Co. Business	Ford
	2	Truck	Beach Wagon	1½ ton	Railroad	Co. Business	Ford
Central of Georgia	1	M. Coach	City	25	Subsidiary	Rev.	Mack
	1	Truck	Exp. Body	3 ton	Railroad	Rev.	White
Central of New Jersey	7	M. Coach	Model BK	29	Subsidiary	Rev.	Mack
Chesapeake & Ohio	1	Truck	Model AA	1½ ton	Railroad	Co. Business	Ford
	1	Truck	Model E	.....	Railroad	Co. Business	Federal
Chicago, Mil., St. P. & Pacific	2	M. Coach	Pass. & Bagg.	12	Railroad	Rev.	Studebaker
	2	Coupe	.....	2	Railroad	Co. Business	Ford
	1	Roadster	.....	2	Railroad	Co. Business	Ford
	1	Roadster	.....	2	Railroad	Co. Business	Chevrolet
	1	Sedan	.....	5	Railroad	Co. Business	Ford
	1	Truck	Stake Body	1½-2 ton	Railroad	Co. Business	Int. Harvester
	1	Truck	Delivery	½ ton	Railroad	Co. Business	Chevrolet
Clev., Cin., Chicago & St. Louis	1	Sedan	.....	5	Railroad	Co. Business	.....
	1	Truck	.....	1½ ton	Railroad	Co. Business	.....
	1	Roadster	.....	2	Railroad	Co. Business	.....
	1	Truck	.....	1¼ ton	Railroad	Co. Business	.....
	1	Roadster	.....	2	Railroad	Co. Business	.....
Cleveland Union Terminals Co.	2	Truck	Model 51A	.....	.....	.....	White
Delaware & Hudson	1	Truck	15B	.....	Railroad	.....	White
Delaware, Lackawanna & Western	1	Truck	.....	1½ ton	Railroad	Co. Business	Maccar
Denver & Rio Grande Western	1	Truck	HS-74	3½ ton	Subsidiary	Rev.	Int. Harvester
	5	Limousine	6-40	7	Subsidiary	Rev.	Packard
	1	M. Coach	65	14	Subsidiary	Rev.	White
	3	M. Coach	BK	29	Subsidiary	Rev.	Mack
	1	M. Coach	BA	25	Subsidiary	Rev.	White
	1	M. Coach	61	10	Subsidiary	Rev.	White
	2	Trailer	3 FY	.....	.....	.....	Winter Weiss
	4	Truck	BJ	.....	Subsidiary	.....	Mack
East Tennessee & Western N. C.	1	M. Coach	Semi-St. Car	37	Subsidiary	Rev.	White
	2	M. Coach	Parlor	21	Subsidiary	Rev.	White
	1	Truck	.....	5 ton	Subsidiary	Rev.	White
	1	Truck	.....	3 ton	Subsidiary	Rev.	Int. Harvester
Eastern Greyhound Lines	90	M. Coach	Parlor	33	.....	Rev.	General Motors
	2	M. Coach	Parlor	53	.....	Rev.	Pickwick
Fonda, Johnstown & Gloversville	2	M. Coach	Model AB	25	Railroad	Rev.	Mack
	4	M. Coach	Model BC	29	Railroad	Rev.	Mack

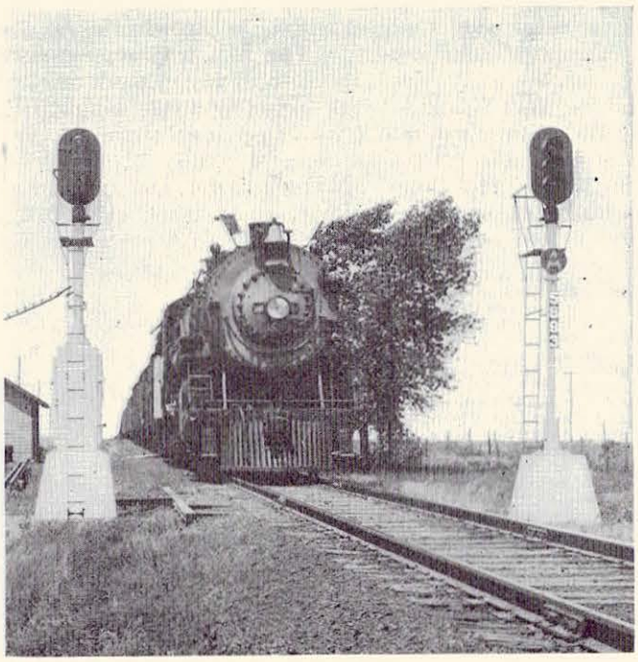
Railroad	No.	Type of Vehicle	Model designation	Seating capacity or truck capacity in tons	Purchased by railroad or subsidiary	Where to be used	Manufacturer
Georgia Railroad	2	M. Coach	.....	40	Subsidiary	Rev.	White
Greyhound Lines	29	M. Coach	Parlor	33	.....	Rev.	Wills
	11	M. Coach	Parlor	53	.....	Rev.	Pickwick
	14	M. Coach	Parlor	33	.....	Rev.	Mack
	6	M. Coach	Parlor	33	.....	Rev.	General Motors
	70	M. Coach	Parlor	33	.....	Rev.	General Motors
Indiana Harbor Belt	1	Truck	.....	2 ton	Railroad	Co. Business	Dodge
Lehigh Valley	3	Truck	Open	½ ton	Railroad	Co. Business	Ford
	1	Truck	Open Body	½ ton	Railroad	Co. Business	Ford
	1	Truck	.....	1½ ton	Railroad	Rev. & Co. Bus.	Chevrolet
	1	Truck	Open Body	1½ ton	Railroad	Co. Business	Chevrolet
	1	Truck	Closed	1½ ton	Railroad	Co. Business	Ford
Los Angeles & Salt Lake	1	Truck	.....	3 ton	Railroad	Rev.	General Motors
	1	Truck	.....	1½ ton	Railroad	Co. Business	Ford
Missouri-Kansas-Texas	1	M. Coach	.....	22	Railroad	Co. Business	Int. Harvester
Missouri Pacific	1	Sedan	Tudor	5	Railroad	Co. Business	Ford
	2	Touring	.....	5	Railroad	Co. Business	Chevrolet
	1	Roadster	.....	2	Railroad	Co. Business	Chevrolet
	1	Truck	Stake Body	2 ton	Railroad	Co. Business	Int. Harvester
	18	M. Coach	Parlor	21	Subsidiary	Rev.	.....
	3	M. Coach	Parlor	16	Subsidiary	Rev.	.....
	9	M. Coach	Parlor	29	Subsidiary	Rev.	.....
Mobile & Ohio	1	Truck	.....	1 ton	Railroad	Co. Business	Chevrolet
Monongahela	1	Truck	.....	1½ ton	Railroad	Co. Business	Ford
New York Central	1	Truck	F-36-C	1½ ton	Railroad	Co. Business	Dodge
	1	Truck	Stake Body	2 ton	Railroad	Co. Business	Dodge
	3	Coupe	.....	2	Railroad	Co. Business	.....
	1	Sedan	.....	5	Railroad	Co. Business	.....
	1	Truck	Dump	1½ ton	Railroad	Co. Business	.....
New York, New Haven & Hartford	2	Truck	Panel	1½ ton	Railroad	Co. Business	Dodge
	2	Truck	Panel	3 ton	Railroad	Co. Business	General Motors
	4	Truck	Panel	3 ton	Railroad	Co. Business	Reo
	2	Truck	Panel	3 ton	Railroad	Co. Business	Dodge
	1	Truck	Panel	2 ton	Railroad	Co. Business	Ford
	5	Truck	Pick-up	½ ton	Railroad	Co. Business	Chevrolet
	1	Truck	Curtain-Side	1½ ton	Railroad	Co. Business	Chevrolet
	1	Truck	Panel	1 ton	Railroad	Co. Business	Dodge
	5	Truck	Sta.-Wagon	½ ton	Railroad	Co. Business	Chevrolet
	7	M. Coach	Parlor	33	Subsidiary	Rev.	General Motors
Norfolk & Western	1	Truck	Enclosed	4¼ ton	Railway	Co. Busines	White
Northland Greyhound Lines	10	M. Coach	Parlor	33	.....	Rev.	Yellow
	27	M. Coach	Parlor	33	.....	Rev.	Will
Oregon Short Line	4	M. Coach	Parlor	34	Subsidiary	Rev.	General Motors
	7	M. Coach	Parlor	29	Subsidiary	Rev.	A. C. F. Motors
Oregon-Washington	2	Truck	.....	1½ ton	Railroad	Co. Business	Ford
Pacific Electric	12	M. Coach	Passenger	24	Railroad	Rev.	Twin Coach
	1	M. Coach	Passenger	40	Railroad	Rev.	Twin Coach
Pacific Greyhound Lines	50	M. Coach	Parlor	38	.....	Rev.	Will
	30	M. Coach	Parlor	38	.....	Rev.	General Motors
	4	M. Coach	Duplex	53	.....	Rev.	Pickwick
Pennsylvania	1	Truck	.....	½ ton	.....	.....	.....
	3	Truck	.....	¾ ton	.....	.....	.....
	9	Truck	.....	1½ ton	.....	.....	.....
	1	Truck	.....	3 ton	.....	.....	.....
	1	Truck	.....	7½ ton	.....	.....	.....
	1	Coupe	.....	2	.....	.....	.....
	1	Touring	.....	5	.....	.....	.....
	2	Sedan	.....	5	.....	.....	.....
	1	Del. Sedan	.....	½ ton	.....	.....	.....
	1	Tractor	.....	.....	.....	.....	.....
People's Rapid Transit Co.	20	M. Coach	Parlor	33	.....	Rev.	General Motors
	2	M. Coach	Duplex	49	.....	Rev.	Pickwick
Railway Express Agency	1,111	Truck	.....	1 ton	.....	Rev.	.....
	21	Truck	.....	1½ ton	.....	Rev.	.....
	141	Truck	.....	2 ton	.....	Rev.	.....
	117	Truck	.....	2½ ton	.....	Rev.	.....
	111	Truck	.....	3½ ton	.....	Rev.	.....
	9	Tractor	.....	5 ton	.....	Rev.	.....
	2	Truck	Electric	1 ton	.....	Rev.	.....
	23	Truck	Electric	2½ ton	.....	Rev.	.....
	21	Truck	Electric	3 ton	.....	Rev.	.....
	50	Truck	Electric	3½ ton	.....	Rev.	.....
	3	Trailer	.....	5 ton	.....	Rev.	.....
Reading	1	Sedan	.....	5	Railroad	Co. Business	Chrysler
	1	Sedan	.....	5	Railroad	Co. Business	Studebaker
	1	Sedan	.....	5	Railroad	Co. Business	Packard
	1	Sedan	.....	5	Railroad	Co. Business	Oakland-Pontiac
	1	Truck	Delivery	2½ ton	Railroad	Shop	General Motors
	14	M. Coach	Club-Parlor	30	Subsidiary	Rev.	Mack
	4	M. Coach	Club	23	Subsidiary	Rev.	General Motors
	2	Truck	Closed	5 ton	Subsidiary	Rev.	General Motors
Richmond Greyhound Lines	5	M. Coach	Parlor	33	.....	Rev.	Yellow
	6	M. Coach	Parlor	29	.....	Rev.	A. C. F. Motors
	2	M. Coach	Parlor	17	.....	Rev.	Yellow
St. Louis Southwestern	5	M. Coach	Parlor	40	Subsidiary	Rev.	General Motors
	3	M. Coach	Parlor	35	Subsidiary	Rev.	White
	2	Sedan	.....	5	Subsidiary	Co. Business	Chevrolet
	5	Tractor	.....	.....	Subsidiary	Rev.	White
	5	Trailer	4 whl.	3 ton	Subsidiary	Rev.	Lapeer
	11	Semi-Trailer	.....	7 ton	Subsidiary	Rev.	Fruehauf
Southern Pacific	1	Coupe	.....	6 cyl.	.....	.....	.....
	1	Sedan	.....	4 cyl.	.....	.....	.....
	1	Truck	.....	¾ ton	.....	.....	.....
	1	Truck	.....	1¼ ton	.....	.....	.....
	4	Truck	.....	1½ ton	.....	.....	.....
	2	Truck	.....	3½ ton	.....	.....	.....
	1	Truck	.....	4 cyl.	.....	.....	.....
Union Pacific	7	M. Coach	Parlor	33	Subsidiary	Rev.	General Motors
	10	M. Coach	Parlor	29	Subsidiary	Rev.	White
	5	M. Coach	Parlor	33	Subsidiary	Rev.	A. C. F. Motors
	6	M. Coach	.....	14	Subsidiary	Rev.	Buick
	2	M. Coach	Parlor	25	Subsidiary	Rev.	Mack
	2	Truck	.....	1½ ton	Railroad	Co. Business	Ford
	1	Truck	.....	1 ton	Railroad	Co. Business	Ford
	1	Truck	.....	1½ ton	Railroad	Co. Business	Int. Harvester
	1	Truck	Tank	500g.	Subsidiary	Co. Business	Ford
Wheeling & Lake Erie	1	M. Coach	65	29	Subsidiary	Rev.	White
	1	M. Coach	65A	29	Subsidiary	Rev.	White

Signaling Construction Continued In Large Volume During 1930

Growth of interlocking and centralized control programs offset decrease in automatic block—Cab signaling extended on Pennsylvania

By John H. Dunn

Signaling Editor, Railway Age



On the 1930 Automatic Block Installation on the Missouri Pacific

THE increased popularity of remote and centralized control for directing train movements was an important factor in maintaining the volume of signaling construction on the railroads in the United States and Canada during 1930. Likewise, interlocking programs exceeded those of 1929, as did also the highway crossing signal construction. Therefore, although the mileage of road equipped with automatic block signals in 1930 was about 20 per cent less than that for the preceding year, the total volume of signaling facilities completed in 1930 exceeded that of 1929 by about 9 per cent, and was well above previous peak years.

Automatic block signals were installed on 3,693 miles of road in the year just closed as compared with 4,785 miles in 1929, and an annual average for the last 10 years of 2,792 miles, the peak record being 5,127 miles in 1927. Car retarder installations were completed in 5 yards last year as compared with 12 yards in 1929. In contrast to these reductions the construction of interlocking plants was carried on more actively, there being 106 new plants involving 2,707 levers as compared with 99 new plants with 2,170 levers built in the preceding year. Likewise, remote and centralized control construction has increased, 839 levers and 607 power switches being included in the 1930 installations, as compared with 540 levers and 280 switches in the previous year. Also included in the field of interlocking are the automatic plants at railroad crossings and gauntlets, 79 such installations being finished last year as compared with 61 in 1929. Increased favor is being shown for the use of spring switches, 152 installations being made in 1930, as compared with 135 in 1929. The construction of automatic highway crossing signals continued in large volume, 2,982 signals and 46 automatic gates being installed during the past year as compared with 2,505 signals in 1929.

As a measure of the total signaling construction, a table shown herewith has been set up, allowing one unit value for each automatic block signal, highway crossing signal, interlocking or remote control lever, power switch, car retarder, skate, etc. Considered on this basis, the total volume of construction in the signaling field for 1930 represented 18,928 units as compared with 17,118

On the 1930 Centralized Control Installation on the Pennsylvania

units in 1929 and 14,718 units in 1927, which in terms of miles of road equipped with automatic block, was considered the previous peak year.

No developments of new signaling equipment were announced during the past year although numerous improvements were made in the detail construction of devices and control systems. The two features of most importance in the application of signaling were the extensive installations of cab signaling made voluntarily by the Pennsylvania and the large installations of centralized traffic control on several roads. The use of simplified interlocking machines with no mechanical locking, but with the locking accomplished electrically, received increased consideration. Typical 1930 installations of such plants were those on the Big Four at Linndale, Ohio, on the Boston & Maine at Lynn, Mass., and on the Canadian Pacific at Trois Rivieres, Que.

Number of Units Completed Each Year	1927	1928	1929	1930
Automatic Block Signals	7,102	5,680	8,061	7,320
Highway Crossing Signals	2,184	2,271	2,505	2,984
Levers of Interlocking	2,480	2,395	2,170	2,707
Power Operated Switches in Interlockings	600	600	508	1,095
Levers of Remote and Centralized Control	225	312	584	839
Power-Operated Switches in Remote and Centralized Control	139	136	309	607
Signals Controlled in Remote and Centralized Control	500†	600	1,150	1,517
Signals in Automatic Interlockings	120†	160†	328	503
Spring Switches	89	153	135	152
Levers Added at Rebuilt Plants	586	455	403	619
Power Switches Added at Rebuilt Plants	300†	250	226	206
Number of Retarders	135	53	221	98
Power Switches in Retarder Yards	185	86	357	153
Power Skates	73	76	161	130
Total	14,718	13,227	17,118	18,928

† Liberal estimate.

Automatic Block Signals Completed During 1930

Of the 3,693 miles of road equipped with automatic block signals during last year, 2,318 miles were single track, 1,254 miles double track, and the remaining 121 miles on lines of three or more tracks. The Southern Pacific equipped 378 miles of single track with signaling, the Missouri Pacific being second with 372 miles, and the Atchison, Topeka & Santa Fe third, with 278 miles. Of the 1,254 miles of double track equipped with automatic signals in 1930, the New York Central Lines equipped

Table A—Automatic Block Signals Completed During 1930

Road	Location	Miles of Road	Number of Signals	Manufacturer
A. T. & S. F.	Oklahoma City, Okla., to Purcell	33.3s	58s	Union
	Independence, Kan. to Ochelata	54.5s	84s 11c	Union
	Holliday, Kan. to Olathe	12.5d	40c	Union
	Willow Springs, Ill. to Joliet	20.0d	8s 22c	Union
	Hutchinson, Kan. to Kinsley	84.4s	124s	Union
	Kinsley, Kan. to Dodge City	28.0s 7.8d	79c	Union
	Galveston, Tex. to Houston	43.7s 4.2d	96s	Union
	Winslow, Ariz. to Joseph City	22.3d	34c	Union
	Dalies, Ariz. to Isleta	14.7s	27c	Union
	Highgrove, Cal. to Riverside	3.1d	13c	Union
	Hobart, Cal. to Fullerton	19.3s	41c	Union
A. C. L.	Yukon, Fla. to Orange City Jct.	103.2s	202c	Union
	Sanford, Fla. to Winter Park	16.1s	33c	Union
B. & O.	Keyser, W. Va. to Piedmont	3.5f	14cp	Union
	Piedmont, W. Va. to Big Curve, Md.	4.5d	10cp	Union
	Big Curve, Md. to Bond	1.5t	8cp	Union
	Bond, Md. to Strecker	4.5d	8cp	Union
	Strecker, Md. to Altamont	6.5t	18cp	Union
	Altamont, Md. to Deer Park	3.5d	5cp	Union
	Deer Park, Md. to Mt. Lake Park	2.5t	10cp	Union
	Mt. Lake Park, Md. to Terra Alta, W. Va.	12.5d	22cp	Union
	Hardman, W. Va. to Grafton	10.0d	17cp	Union
	Loveland, Ohio to Midland City	20.0d	36cp	Union
	Roachton, Ohio to Bates	7.5d	15cp	Union
	Bates, Ohio to Toledo	4.5s	8cp	Union
B. & Ar.	Dyer Brook, Me. to Oakfield	0.8s	4s	Union
B. & M.	W. Lynn, Mass. to Swampscott	5.0d	9c	Union
	Winchester, Mass. to Wilmington	7.5d	13c	Union
	Wilmington Jct., Mass. to Lowell Jct.	3.0d	6c	Union
	E. Portal, Mass. to Soapstone	2.5d	2c	GRS
	E. Fitchburg Mass. to Soapstone	82.5d	156c	GRS
C. P.	Bedell, Ont. to Smith Falls	20.0d	26c	GRS
	Bowmanville, Ont., to Leaside	33.4s 8.8d	74c	Union
	Hamilton Jct., Ont. to Main St. Hamilton	1.4d	4c	GRS
	London, Ont., to Lobo	7.0s	16c	Union
	Smith Falls, Ont., to Glen Tay	15.0d	20c	Union
	Outremont, Que., to Mile End	1.0d	3c	Union
	Outremont, Que., to Breslay	1.0d	4c	GRS
	Lanoraie, Que., to Berthier	8.4s	14c	Union
	Megantic, Que.	4.2s	6c	GRS
	North Bend, B. C., to Ruby Creek	50.0s	74s	GRS
	Port Moody, B. C.	3.5	4s	Union
C. N.	Grand Mere, P. Q.	3.2s	4s	GRS
	Belleville, Ont. to Brockville	95.0d	130c	RRS
	Saskatoon Terminals	3.1s	4c 4c	GRS Union
	No. Edmonton, Alta. to Clover Bar	5.0s	9s	GRS
	Edmundston, N. B.	2.8s	5c	Union
	Moncton, N. B.	1.0d	2s	Union
	No. Sydney, N. S.	2.5s	4c	Union
G. T. W.	Lansing, Mich. to Swartz Creek	37.0d	46c	Union
	Belsay, Mich. to Port Huron	54.0d	61c	Union
C. & O.	Richmond, Va. to Westham	7.0d	6c	Union
	Columbus, Ohio to Upper Sandusky	64.0d	92c	Union
	Richmond, Va. to AR Cabin	1.0d	4c	Union
	Clifton Forge, Va. to Iron Gate	2.0d	3c	Union
	Old Point Jct., Va. to Oriana	10.0d	20c	Union
	Low Moor, Va. to Steele	5.0d	12c	Union
	Hilldale, W. Va. to Hinton	5.0d	10c	Union
	Montgomery, W. Va. to Kanawha	10.0d	22c	Union
	Teays, W. Va. to Blue Sulphur	17.0d	44c	Union
	Huntington, W. Va. to Clyffeside	14.0t	92c	Union
	Augusta, Ky. to Newport	42.0d	78c	Union
C. & N. W.	Des Plaines, Ill. to Barrington	13.5t	60c	GRS
C. B. & Q.	S. St. Joseph, Mo. to St. Joseph	2.6s	4s	GRS
	Biggsville, Ill.	....	2s	GRS
C. M. St. P & P.	Hillsdale, Wash.	0.5s	2c	Union
C. R. T. Co.	Willow St. Chicago, to Orchard St.	4.0b	22c	Union
C. R. I. & P.	Miscellaneous	....	8c	RRS
D. & H.	Kelleys, N. Y. to Delanson	5.0s	5s	GRS
D. L. & W.	Newark, N. J. to Montclair	4.3d	11c	Union
	Summit, N. J. to Gladstone, N. J.	21.5s	56c	Union
	Orange, N. J. to Dover	29.0d	109c	Union
	Hoboken, N. J. to Bergen Jct.	0.8d	16c	Union
D. & R. G. W.	Soldier Summit, Utah to Provo	50.0d	77c	GRS
E. J. & E.	Spaulding, Ill. to Barrington	9.0s	15c	GRS
F. W. & D. C.	North Yard, Tex. to Henrietta	88.0s	113c	GRS
L. V.	West End Oak Island Yard, N. J.	3.3s		
	to Newark Bay Drawbridge	6.5d	8p	GRS
L. & N.	Maunie, Ill. to E. St. Louis	4.1d 124.9s	261s	GRS
	Tunnel Signal M. P. 222	4.1d	1s	
M. E. R. L.	6th St. Milwaukee, Wis. to 41st St.	1.5d	14c	Union
M.-K.-T.	LaGrange, Tex. to Cat Springs	38.3s	46c	RRS
	Whitesboro, Tex.	1.0s	1c	Union
	Dallas, Tex. to Bethard	7.5s	11c	Union
	Greenville, Tex.	1.0s	4c	Union
	Eureka, Tex. to Houston	7.0s	21c	Union
	Benz, Tex. to Haig	8.0s	7c	Union
	Fort Worth, Tex.	....	1c	Union
	Temple, Tex.	....	4c	Union
	Vinita, Okla.	....	4c	Union
	Nevada, Mo.	....	4c	Union
	Ft. Scott, Kan.	....	5c	Union
	Stringtown, Okla., to Atoka	5.0d	3s	Union
	McBaine, Mo. to New Franklin	17.0s	24c	Union
	Oakwood, Kan. to Cross	61.0s	92c	Union
M. P.	Osawatomie, Kan. to Council Grove	88.0s	155c	RRS
	Gypsum City, Kan. to McCracken	128.0s	184c	RRS
	Sugar City, Colo. to Pueblo	53.0s 2.0d	100c	RRS
	Collinston, La. to Monroe	24.0s	56c	RRS
	Riverton, La. to Urania	28.0s	50c	RRS
	Cole Jct., Mo. to Lamine	48.0s	80c	RRS
	Allenton, Mo. to H. D. Jct.	17.0d	64c	GRS
	Myrick, Mo.	3.0s 4.0d	27c	GRS
H. B. & T.	H. E. & W. T. Xing. to Percival Jct.	....	7c	GRS
Napierville Jct.	Lacolle, Que.	....	31c	GRS
N. C. & St. L.	KC Jct., Tenn. to Memphis	1.7s	4c	Union
N. Y. C.	Grand Central Term., N. Y. to Mott Haven	4.1f	177c	GRS
	Beacon, N. Y. to Poughkeepsie	13.6f	50c	GRS
	Nepperhan, N. Y. to M. P. 12	1.3s	2c	GRS
	Hillsdale, N. Y. to M. P. 110	1.7s	2c	GRS
	Wellsboro Jct., Pa. to Lawrenceville	2.4s 2.2d	3c	GRS
	Carman, N. Y. to M. P. 154.5	1.8f	4c	GRS
	Rome, N. Y. to M. P. 251.5	1.8f	8c	GRS
	Tribes Hill, N. Y. to M.P.182.1	1.0f	4c	GRS
	Batavia, N. Y. to M.P. 1.5	1.5s	1c	GRS

Road	Location	Miles of Road	Number of Signals	Manufacturer
	N. Buffalo Jct., N. Y. to M.P. 8.2	3.0d	4c	GRS
	Lyons Jct., N. Y. to Lyons	0.5s	1c	GRS
B. & A.	Brighton, Mass. to Riverside	6.2f	30c	GRS
	Riverside, Mass. to Natick	5.8f	18c	GRS
	Springfield, Mass. to W. Springfield	1.5f	5c	GRS
C.C.C. & St. L.	Morgan, Ohio to Union City, Ind.	45.0d	73c	
	Brant, Ind. to Clarks Hill	45.0d	64c	
	Eastwood, Ind. to Taft	27.0d	43c	Union
	Cleveland, O. to Linndale	....	30c	GRS
M. C.	St. Thomas, Ont. to Windsor	108.0d	154c	GRS
Rutland	Grand Isle, Vt. to North Hero	3.4s	4c	GRS
N. Y. C & St.L.	Brocton, N. Y. to Thornton Jct., Pa.	50.0s	90c	Union
	Altamont, Ind., to Lafayette	2.0d	33c	Union
N. Y. N. H. & H.	Westerly R. I. to Bradford	1.6d 3.9t	14c	Union
	Kingston, R. I. to Davisville	1.6d 9.5t	26c	Union
N. Y. O. & W.	Fish Creek, N. Y.	1.5s	4c	Union
N. Y. R. T.	Brooklyn, N. Y. to Jamaica	....	150c	GRS
	Broadway, N. Y. to 4th Ave.	....	181c	GRS
N. & W.	Idlewild, Ohio to Berrys	2.6s	7p	Union
N. P.	St. Paul, Minn. to Minneapolis	9.2d	27c	RRS
	O.W.R.R. & N.Xing, Wash. to Spokane	1.5d	5c	RRS
Pac. Elec.	Los Angeles, Cal. to Glendale	0.03s 9.5d	1c	Union
Penn	Trenton, N. J. to Liddonfield, Pa.	21.0f	69p	Union
	Northumberland, Pa. to Renovo	90.6d	84p	Union
	Philadelphia, Pa. to Norristown	12.4d	16p	Union
	Struthers, Ohio to Girard	9.2d	16p	Union
	Johnstown, Pa. to New Florence	13.0d	18p	Union
	Aspinwall, Pa. to Kiski Jct.	21.8d	28p	Union
	Chicago	2.4d	15p	Union
	Antrim, Ohio	1.0d	2p	Union
	Dunkirk, Ohio	1.0d	2p	Union
	Lafayette, Ohio	1.0d	6p	Union
	Lima, Ohio	2.0d	4p	Union
	Delphos, Ohio	5.0d	10p	Union
	Columbia City, Ind.	5.0d	12p	Union
	Larwill, Ind.	1.0d	6p	Union
	Winchester, Ind. to Ridgeville	8.5s	10p	Union
L. I.	MP 30 N. Y. to MP 33	3.0d	7s	Union
Portland Terminal Co.	Westbrook, Me.	....	1s	Union
Pgh. Ry.	Mine 3, Pa. to Roscoe	22.0s 9.0d	65c	Union
Reading	Reading Terminal, Philadelphia, Pa. to Wayne Jct.	0.4a 0.1b 0.9c 3.7f 0.2d	125c	Union
	Wayne Jct. Philadelphia, Pa. to Jenkintown	0.5f 0.1t 5.0d	35c	Union
	Jenkintown, Pa. to Lansdale	13.6d	34c	Union
	Philadelphia, Pa. to Shawmont	5.8d	15c	Union
St. L.-S. F.	Southeastern Jct., Mo. to Cape Girardeau	127.7s	215s	Union
S. A. L.	Hamlet, N. C. to Monroe	52.1s	91c	Union
S. P.	Saline, Utah to Weber Jct.	11.9s	10s	Union
	Port Costa, Cal. to Benicia Jct.	5.6s 5.1d	17c	Union
	18th St. Oak., Cal.	0.3d	3c	Union
	Dutton Ave., Oak, Cal.	....	20c	Union
	Alameda, Cal.	0.9d	3c	Union
	West San Jose, Cal. to Vasona Jct.	5.5s	14c	Union
	Pomar, Cal. to Coyote	2.5s	6c	Union
	El Pinal, Cal. to Brighton	*37.0s *3.0d	178c	Union
	Searles, Cal.	1.8s	2s	Union
	Cantu, Cal. to Araz Jct.	2.6	4s	Union
	Pratt, N. Mex. to Mastoden	132.0s	202s	Union
	El Paso, Tex. to Temporal	99.0s	142.s	Union
	Santa Rose, N. Mex. to Tucumcari	59.0s	95s	Union
L. & T.	Garrison, Tex.	1.0s 0.9d	4s	Union
T. C. I. & R. R.	Steeley, Ala., to Bayview	5.0s	7c	Union
T. & P.	Hodge, Tex. to Whitesboro	67.0s	100c	GRS
	Shreveport, La. to Hollywood Yd.	2.6s	23c	GRS
U. P.	Ellis, Kan. to Sharon Springs	126.0s	211c	Union
O. S. L.	Various passing track extensions		6s	Union
S. J. & G. I.	Upland, Kan. to Hastings, Neb.	120.0s	187c	Union
Wabash	Lakeville, Ind. to N. Liberty	12.0s	2s	Union
	Montpelier, Ohio to New Haven, Ind.	42.0s	71c	Union
	Orland Park, Ill.	3.0d	2c	Union
	Totals	2,318.0s 1,253.7d 51.5t 64.5f 0.4a 4.1b 0.9c	1,433s 5,402c 313p 172cp	
		3,693.1	7,320	

In "Miles of Road" column: s = Single Track. d = Double Track. t = Three Tracks. f = Four Tracks. a = Five Tracks. b = Six Tracks. c = Seven Tracks

In "No. of Signals" column: s = Semaphore. c = Color-light. p = Position-light. cp = Color-position-light.

* = Installed in connection with centralized control.

230 miles, the Pennsylvania 189 miles, and the Chesapeake & Ohio 163 miles.

A total of 7,320 automatic signals were installed during the year just closed. Of the total, 5,887 were light signals as compared with 5,830 of the same type installed in 1929. However, only 1,433 semaphores were installed in 1930, as compared with 2,178 in 1929, showing that the construction of semaphores is giving way rapidly in favor of light signals. The greater portion of the semaphores, totaling 1,380, were installed on five roads, the Southern Pacific using 455, the Atchison,

Table B—Automatic Block Signals Under Construction December 31, 1930

Road	Location	Miles of Road	Number of Signals	Manufacturer
A. T. & S. F.	Hale, Tex., to Dallas	7.0s	10s 1a	Union
	Fullerton, Cal. to Fallbrook Jct.	59.2s	121c	Union
	DelMar, Cal. to San Diego	23.3s	53c	Union
B. & O.	Terra Alta, W. Va. to Rowlesburg	12.0t	42cp	Union
	Rowlesburg, W. Va. to Blaser	5.0d	8cp	Union
	Blaser, W. Va. to Hardman	11.0t	42cp	Union
	Glenwood Jct., Pa. to Gilkeson	19.0d	32cp	Union
	Gilkeson, Pa. to Wheeling, W. Va.	*43.0s	88cp	GRS
	North Lima, Ohio to Roachton	*56.0s	92cp	Union
	Maynard, Ohio to E. Fairpoint	* 3.7s	8cp	
	East Fairpoint, Ohio to W. Fairpoint	* 1.3t	7cp	
	West Fairpoint, Ohio to End D. T.	* 1.5d	4cp	
B. & M.	Dover, N. H. to Rigby	20.0s 20.0d	43c	Union
C. & O.	Griffith, Ind. to Hammond	7.0d	13c	
Erie	Griffith, Ind. to Hammond	8.0d	18c	Union
L. & N.	Glidden, Ky. to Popeville	1.6s	5s	
	Hagans Tunnel Signals	1.8s	2s	
M. P.	Lake Hill, Mo. to Allenton	14.0d		
N. Y. B. T.	103rd St., New York City, to Chambers St.	....	222c	GRS
N. Y. C.	M. P. 71.3, N. Y. to Dover Furnace	1.2s	1c	GRS
	Boston Corners, N. Y. to M.P. 101	2.9s	2c	GRS
	Copake Falls, N. Y. to M.P. 105.6	2.1s	2c	GRS
	Patterson, N. Y. to M.P. 63.1	5.6s	2c	GRS
	Lacona, N. Y. to M.P. 45.3	4.0d	2c	GRS
	C. B. Jct., N. Y. to M.P. 15.72	0.2s	2c	GRS
	C. V. Jct., Pa., to M.P. 85	2.8s	1c	GRS
	St. Clair Place, N. Y. to Spuyten Duyvil	0.9t 4.8d	17c ...	GRS ....
C. C. C. & St. L.	Union City, Ind. to Anderson	46.0d	72c	Union
N. Y. N. H. & H.	Cedar Hill, Conn. to New London	39.9d	65c	GRS
N. Y. R. T.	Nassau St. Montague Tubes to Chambers St.	....	34c	GRS
	14th St., 8th Ave., to 6th Ave.	....	5c	GRS
	Franklin Ave., Fulton St. to Stillwater	....	73c	GRS
Penn	Macksville, Ind. to Farrington, Ill.	5.3s	9p	Union
	Smithboro, Ill. to Marty	15.6s	28p	Union
Reading	Glenside, Pa. to Hatboro	4.9s 1.9d	16c ...	Union ....
	Lansdale, Pa. to Doylestown	10.0s	21c	Union
S. P.	Stockton, Cal.	0.9d	5c	Union
	Gilroy, Cal. to Sargent	5.5s	17c	Union
	Hathaway, Cal. to San Luis Obispo	21.1s	8s	Union
U. P.				
L. A. & S. L.	Pierce, Nev. to Bracken	4.0s	6c	Union
	Totals	277.8s 172.0d 25.2t	17s 822c 37p 323cp	
		475.0	1,199	

Legend—

In "Miles of Road" column: s = Single Track. d = Double Track. t = Three Tracks.

In "No. of Signals" column: s = Semaphore. c = Color-light. p = Position-light. cp = Color-position-light.

* = Installed in connection with centralized control.

* Centralized Traffic Control System

Topeka & Santa Fe 370, the Louisville & Nashville 262, the St. Louis-San Francisco 215, and the Canadian Pacific 78, thus leaving 53 semaphore signals as installed on all other roads. Of the light signals, 723 color-light signals were installed on the Missouri Pacific lines, 677 on the New York Central Lines, and 398 on the Union Pacific.

Some interesting facts are shown by a study of the methods of power supply used for the signaling installed in 1930. Straight alternating-current signal equipment

Table C—Automatic Block Signals Contemplated for 1931

Road	Location	Miles of Road	Number of Signals	Manufacturer
Ann Arbor	Milan, Mich. to Ann Arbor	13.7s	5s	Union
			22c	
A. T. & S. F.	Chanute, Kan. to Independence	39.0s	.....	Union
	Ochelata, Okla. to Tulsa	38.0s	.....	Union
	Rosenberg, Tex. to Bellville Yd.	40.4s	.....	
	Carrizo, Ariz. to Joseph City	25.0d	50c	Union
	Barstow, Cal. to Mojave	71.8s	118c	Union
	Highgrove, Cal. to Colton	3.8d	6c	Union
B. & O.	Parkersburg, W. Va. to Chillicothe, O.	88.0s	176cp	.....
		8.5d	...	....
	Chillicothe, Ohio, to Midland City	53.0s	102cp	.....
	Seymour, Ind. to Washington	82.4s	194cp	.....
	Washington, Ind. to Shattuc, Ill.	108.7s	232cp	.....
		4.0d		
	Shattuck, Ill. to E. St. Louis	53.45	104cp	.....
	North Vernon, Ind. to New Albany	54.0s	106cp	.....
C. & O.	Cheviot, Ohio to Cottage Grove, Ind.	40.0d	72c	Union
	Limeville, Ky., to Parsons, Ohio	91.0d	113c	Union
	Upper Sandusky, Ohio to Cummings	48.0d	72c	Union
	Oriana, Va. to Williamsburg	13.0d	22c	Union
	Fort Springs, W. Va. to Talcott	16.0d	29c	Union
	Hinton, W. Va. to C. W. Cabins	2.0d	4c	Union
	Macdougal, W. Va. to Sewell	10.0d	22c	Union
	Montgomery, W. Va. to Cabin Creek Jct.	9.0d	18c	Union
	Siloam, Ky. to Garrison	17.0d	27c	Union
C. M. St. P. & P.	Austin, Minn. to Ramsey	2.0s	4c	Union
	Janesville, Wis. to Milton Jct.	9.0s	15c	Union
	Milwaukee, Wis. to N. Milwaukee	5.0d	14c	Union
	Polo, Mo. to Birmingham	38.0d	76c	Union
C. R. I. & P.	Trenton, Mo. to Moseby	22.0s	.....	.....
		45.0d		
D. & R. G. W.	Pueblo, Colo. to Swallows	11.0d	11c	.....
	Florence, Colo. to Canon City	9.0d	13c	.....
E. J. & E.	Barrington, Ill. to Leithton	10.0s	13c	.....
G. N.	Swan River, Minn. to Gonn	16.5s	....	.....
	Boylston, Minn. to Nickerson	23.5s	....	.....
	Clearwater Jct., Minn. to St. Cloud	62.6s	....	.....
	S. Bellingham, Wis. to Cement Plant	5.3s	....	.....
	New Westminster, B. C. to Vancouver	13.1s	....	.....
M-K-T.	Dallas, Tex. to Waxahachie	28.0s	42c	.....
M. P.	Council Grove, Kan. to Gypsum City	54.0s	....	.....
	Padonia, Kan. to Neb. State Line	5.3s	....	.....
	Nebraska State Line to Verdon, Neb.	15.7s	....	.....
	LaPlatte, Neb. to Gilmore Jct.	9.0s	....	.....
N. Y. C.				
M. C.	Niagara River, Ont. to St. Thomas	133.0d	179c	GRS
Rutland	Colchester, Vt. to S. Hero	3.3s	4c	GRS
	N. Hero, Vt. to Isle LaMotte	3.3s	4c	GRS
N. Y. C. & St. L.	Brocton, N. Y. to Buffalo	50.0d	75c	Union
N. Y. N. H. & H.	Sound View, Conn. to Waterford	11.5t	23c	GRS
Pac. Elec.	N. Hollywood, Cal. to Van Nuys	7.0s	17c	.....
	Los Angeles, Cal. to Watts	6.5f	70c	.....
	Ramona, Cal. to Covina	1.2s	39c	....
P. M.	Delray, Sixth St., Detroit, Mich.	4.2d	....	.....
Reading	Jenkintown, Pa. to Yardley	10.9d	53c	Union
		0.7t		
		9.3f		
	Yardley, Pa. to West Trenton	2.2d	6c	Union
St. L.-S. F.	Sapulpa, Okla. to Bryant	51.0s	80s	Union
	Memphis, Tenn. to Hickory Flat, Miss.	63.0s	104s	Union
S. P.	Portland, Ore.	1.1d	4c	Union
	Sparks, Nev.	0.1d	3c	Union
	San Jose, Cal. to Lick	5.7d	12c	Union
	Fresno, Cal.	1.3d	6c	Union
	Bakersfield, Cal.	0.3d	2c	Union
	Tucson, Ariz.	0.4d	3c	Union
U. P.	Upland, Kan. to Menoken	70.0s	108c	Union
	Hastings, Neb. to Gibbon	28.0s	43c	Union
Q. S. L.	Idaho Falls, Idaho to Ashton	51.3s	102c	Union
	Various passing track extensions		6s	
	Totals	1,196.5s	189s	
		619.0d	1,522c	
		12.2t	914cp	
		15.8f		
		1,843.5	2,625	

Legend—
In "Miles of Road" column: s = Single Track. d = Double Track. t = Three Tracks. f = Four Tracks.
In "No. of Signals" column: s = Semaphore. c = Color-light. cp = Color-position-light.

was used on 140 miles of single track and 152 miles of multiple track, including 966 signals. This mileage was on electrified lines or on lines equipped for continuous-type automatic train control or cab signals. The a-c. floating method, using storage batteries charged by alternating current through rectifiers, was utilized on 573 miles of single and 1,045 miles of multiple-track lines using 2,926 signals. This a-c. floating system was used also for the line circuits and signal standby, but with primary battery for track circuits on 549 miles of single and 105 miles of multiple track using 1,250 signals. The a-c. primary, using the a-c. supply for normal signal operation and primary battery for the line and track circuits, was used on 209 miles of single track, 337 signals. Primary battery was used for signal operation as well as for track circuits, on 827 miles of single and 20 miles of double track involving 1,391 signals. The remainder of the signaling installed in 1930 incorporated various combinations of the above mentioned systems.

Interlocking Construction in 1930

The interlocking construction for 1930 included 106 new plants, of which 26 were mechanical, 44 electrical, 24 electro-pneumatic, and 12 electro-mechanical; a total of 2,707 levers being involved. At 82 other plants which were re-built, 619 new levers were added, making a total of 3,326 new levers of interlocking installed during 1930. The largest plant completed during the year was the 468-lever electric plant in the Cleveland Union Terminal, Cleveland, Ohio.

The increasing popularity of the installation of automatically-controlled signals, termed automatic interlockers, for the protection of railroad crossings, gauntlets, and junctions is evidenced by the installation of 79 such plants, involving 503 signals, during 1930, as compared with 61 plants including 328 signals in the preceding year. The Chicago, Rock Island & Pacific completed seven of

Table D—Interlocking Plants Completed During 1930

Road	Location	Manufacturer	Working Levers: Mechanical	Electrical	Electro-Pneumatic	Elec. Mech.: Mech	Elec. Mech.: Elec.
A. T. & S. F.	Arcola, Tex.	Union	9	..	..	..	..
	Joliet, Ill.	Union	..	4	..	..	..
	Riverside Jct., Cal.	G.R.S.	..	26	..	..	..
A. C. L.	Palatka, Fla.	Union	2	..	..	..	..
	Palatka, Fla.	Union	2	..	..	..	..
B. & O.	Mt. Lake Park, Md.	Union	..	..	..	13	11
	Terra Alta, W. Va.	G.R.S.	..	36	..	..	..
	Midland City, Ohio		..	15	..	..	..
	Penna. Jct., Ohio		..	14	..	..	..
	Riverside, Baltimore, Md.	Union	..	..	20	..	..
	Heath, Ohio	Union	..	..	..	27	26
	Curtis Creek, Baltimore, Md.	Union	8	..	..	..	..
	Canton, Md.	Union	..	2	..	..	..
	E. Columbus, Ohio	Union	..	..	..	34	3
B. & M.	Lynn, Mass.	Union	..	..	14	..	..
	Wakefield, Jct., Mass.	Union	..	..	7	..	..
	Waltham, Mass.	Union	..	..	17	..	..
	Rockingham, N. H.	Union	..	..	11	..	..
	Northfield, Mass.	Union	..	..	10	..	..
C. N	Thorold, Ont.	Union	16	..	..	..	..
	Merriton, Ont.	G.R.S.	..	12	..	..	..
C. & O.	Doswell, Va.	Union	..	..	14	..	..
	Huntington, W. Va.	Union	..	..	36	..	..
	East Clayton, Ohio		..	1	..	..	..
	Kenova, W. Va.	Union	..	..	36	..	..
	East Allegheny, Va.	Union	..	11	..	..	..
C. & N. W.	Menominee, Mich.	G.R.S.	2	..	..	..	..
	Oconto, Wis.	G.R.S.	2	..	..	..	..
	S. Centralia, Wis.	G.R.S.	2	..	..	..	..
C. B. & Q.	Downers Grove, Ill.	G.R.S.	..	31	..	..	..
C. M. S. P. & P.	Chehalis Jct., Wash.	Union	..	..	..	9	..
C. R. T.	Laflin St., Chicago	Union	4	..	..	..	..
C. St. P. M.&O.	Lakeland Jct., Minn.	G.R.S.	4	..	..	..	..
Clev. U. T.	Cleveland, Ohio	G.R.S.	..	468	..	..	..
D. L. & W.	East & West Summit, N. J.	Union	..	..	18	..	..
	Grove St., Hoboken, N. J.	Union	..	..	11	..	..
Erie	Hornell, N. Y.	Union	..	..	..	10	4
Ford	River Rouge, Mich.	Union	..	3	..	..	..
Ind. S. C.	Ft. Wayne, Ind.	G.R.S.	4	..	..	..	..
K. & I. T	New Albany, Ind.	G.R.S.	..	8	..	..	..
L. V.	Oak Island Jct., N. J.	G.R.S.	..	42	..	..	..
Me. C.	Yarmouth Jct., Me.	Union	..	3	..	..	..
	Danville Jct., Me.	Union	..	2	..	..	..

Road	Location	Manufacturer	Working Levers: Mechanical	Electrical	Electro-Pneumatic	Elec. Mech.: Mech.	Elec. Mech.: Elec.
M-K-T	Ft. Scott, Kan.	Union	2	..	..	..	..
M. P.	Bradford, Ark.		2	..	..	..	..
	Lindsborg, Kan.		2	..	..	..	..
	Geneseo, Kan.		2	..	..	..	..
	Madeline, Kan.		2	..	..	..	..
	Standard, La.		2	..	..	..	..
	St. Louis, Mo.	G.R.S.	..	57	..	..	..
	Krotz Springs, La.	G.R.S.	..	2	..	..	..
	Auburn, Neb.		2	..	..	..	..
	Verdon, Neb.		12	..	..	..	..
	Sugarland, Tex.	G.R.S.	12	..	..	..	..
Monongahela Connecting	Pittsburgh, Pa.	Union	15	..	..	..	..
N. Y. C.	New Hamburg, N. Y.	G.R.S.	..	72	..	..	..
	South Bend, Ind.	G.R.S.	..	259	..	..	..
	New York City, N. Y.	G.R.S.	..	44	..	..	..
	Harlem River, N. Y.	G.R.S.	..	29	..	..	..
	Mott Haven Jct., N. Y.	G.R.S.	..	216	..	..	..
C.C.C. & St.L.	Glenn, Ind.		..	12	..	..	..
	Hazelrigg, Ind.	Union	..	12	..	..	..
	Dale, Ind.	Union	..	12	..	..	..
	Linndale, Ohio	G.R.S.	..	23*	..	..	..
	65th St., Cleveland, O.	G.R.S.	..	15*	..	..	..
M. C.	Detroit, Mich.	G.R.S.	..	79	..	..	..
Rutland	Grand Isle, Vt.	G.R.S.	4	..	..	..	..
N. Y. C. & St. L.	Altamont, Ind.	Union	..	23	..	..	..
	Red Key, Ind.	Union	..	..	..	10	4
	Templeton, Ind.	Union	..	19	..	..	..
	E. 75th St., Cleveland, O.	G.R.S.	..	28	..	..	..
N. Y. N. H.&H.	Kingston, R. I.	Union	..	19	..	..	..
N. Y. R. T.	Cresent St., New York	G.R.S.	..	10	..	..	..
N. & W.	E. Columbus, Ohio	Union	..	..	47	..	..
N. W. P.	Black Point, Cal.	Union	..	..	..	2	2
	Petaluma, Cal.	Union	..	..	..	2	2
P. E.	Los Angeles, Cal.	Union	..	..	7	..	..
Penn.	Greenville, N. J.	Union	..	..	35	..	..
	Jersey City, N. J.	Union	..	..	18	..	..
	Trenton, N. J.	Union	..	..	53	..	..
	Oil City, Pa.	Union	..	..	29	..	..
	Red Key, Ind.	Fed.	..	..	..	16	.
	Conemaugh, Pa.	Union	..	..	19	..	..
L. I.	Ozone Park, N. Y.	Union		..	16	..	..
	Bethpage, N. Y.	Union	..	5	..	..	..
	Hempstead, N. Y.	Union	..	2	..	..	.
	Jamaica, N. Y.	Union	..	2	..	..	..
P. R. T.	Philadelphia, Pa.	Union	..	..	31	..	..
R. I. & S.	Youngstown, Ohio	Union	..	..	10	..	..
R. F. & P.	Doswell, Va.	Union	..	..	14	..	..
St. L.-S. F.	Cape Girardeau, Okla.	Union	12	..	..	..	..
S. A. L.	Charleston, S. C.	Union	4	..	..	..	..
S. P.	Georgiana Sl., Cal.	Union	2	..	..	..	..
	Martinez Ben., Cal.	Union	..	..	7	..	..
	Martinez, Cal.	G.R.S.	..	26	..	..	..
	Newark, Cal.	G.R.S.	..	20	..	..	..
	Southgate, Cal.	Union	10	..	..	..	..
S. P. L. & T.	Chacahoula, La.	Union	..	..	..	2	1
	Miller, Tex.	G.R.S.	..	3	..	..	..
	Lake Charles, La.	Union	..	..	..	1	1
T. & P.	Cisco, Tex.	G.R.S.	..	17	..	..	..
T. H. & B.	Hamilton, Ont.	G.R.S.	..	72	..	..	..
U. P.	Omaha "C", Neb.	Union	..	29	..	..	..
	Omaha "A", Neb.	G.R.S.	..	43	..	..	..
U. R. R.	Monongahela Jct., Pa.	Union	..	..	39	..	..
W. B. & A.	Linthicum, Md.	Union	..	..	..	5	..
Totals	New	Plants 106	..	..	..	..	..
		Levers 2,707	145	1,828	549	131	54
	Rebuilt not listed in table	Plants 82	..	..	..	..	..
		Levers 619	70	213	68	111	157
	Grand Total	Levers 3,326	215	2,041	617	242	211

* Centralized Control Type Machine.

these plants, the Missouri Pacific six, the Chicago, Burlington & Quincy five, and the Minneapolis & St. Louis four.

The railroads are continuing the installation of spring switches as a means of preventing train stops at the ends of double track, at yard leads, and at certain sidings where train movements predominate in one direction. A total of 152 spring-switch layouts were completed last year, the Sante Fe installing 35, the Southern Pacific 24, and the Chesapeake & Ohio and the Union Pacific 11 each.

Centralized traffic control systems, including the power operation of switches and the direction of train movements by signal indication, are being installed extensively. The installation on 43 miles of the Southern Pacific between El Pinal, Cal., and Elvas is typical of the single-track installations completed during the past year. The application of this system for the direction of train movements in either direction on one or more tracks of multiple-track lines is gaining favor, such a system being installed on the Boston & Maine on 85 miles of double track between East Portal, Mass., and Fitchburg.

The simplified machines without mechanical locking and the special control circuits which have been developed for centralized traffic control are being adopted also for what has ordinarily been considered interlocking layouts. Such a plant was installed on the Big Four at Linndale, Ohio, where facility of operation was required. On the Boston & Maine such a plant at Lynn, Mass., includes layouts formerly handled by two interlockings and a block office.

Numerous other remote and centralized control installations were completed in 1930, to a total number of

Table E—Interlocking Plants Under Construction December 31, 1930

Road	Location	Manufacturer	Working Levers: Mechanical	Electrical	Electro-Pneumatic	Mach. Elec.: Mech.	Mach. Elec.: Elec.
A. T. & S. F.	Augusta, Kan.	G.R.S.	..	48	..	..	..
	Gainesville, Tex.	G.R.S.	..	21	..	..	..
A. C. L.	Sanford, Fla.	Union	..	..	4	..	..
B. & M.	Salem, Mass.	G.R.S	..	..	..	..	..
	E. Northfield, Mass.	Union	..	..	10	..	..
	Bellows Falls, Vt.		..	..	..	..	..
	Johnsonville, N. Y.	Union	..	..	12	..	..
C. B. & Q.	Galesburg, Ill.	G.R.S.	..	114	..	..	..
Erie	Lackawaxen, Pa.	Union	..	..	..	13	7
	Susquehanna, Pa.	Union	..	..	..	7	3
Indpls. Union	Indianapolis, Ind.	Union	..	..	115	..	..
L. & N.	Birmingham, Ala. 13th St.	Union	..	60	..	..	..
M. P.	Georgetown, La.		2	..	..	..	..
	Tioga, La.		2	..	..	..	..
	Selma, La.		2	..	..	..	..
	Pineville Jct., La.		2	..	..	..	..
	Rochelle, La.		2	..	..	..	..
G. C. L.	Bay City, Tex.	G.R.S.	..	2	..	..	..
N. Y. B. T.	81st St. New York	G.R.S.	..	9	..	..	..
	81st St. New York	G.R.S.	..	10	..	..	..
	59th St. New York	G.R.S.	..	53	..	..	..
	42nd St. New York	G.R.S.	..	24	..	..	..
	42nd St. New York	G.R.S.	..	13	..	..	..
	30th St. New York	G.R.S.	..	30	..	..	..
	Canal St. New York	G.R.S.	..	20	..	..	..
	Hudson Term. New York	G.R.S.	..	9	..	..	..
	Chambers G. New York	G.R.S.	..	27	..	..	..
	8th Ave., Subway, New York	Union	..	..	27	..	..
	8th Ave., Subway, New York	Union	..	..	30	..	..
	207th St. Yard, New York	Union	..	..	92	..	..
	207th St. Yard, New York	Union	..	..	46	..	..
	207th St. Yard, New York	Union	..	..	5	..	..
	168th St., New York	Union	..	..	19	..	..
	174th St., New York	Union	..	..	11	..	..
N. Y. C.	Sedgwick Ave., N. Y.	G.R.S.	..	25	..	..	..
	Black Rock, N. Y.	G.R.S	..	38	..	..	..
	M. C. Detroit, Mich.	G.R.S.	..	2	..	..	..
N. Y. R. T.	Broad St., New York, N. Y.	G.R.S	..	32	..	..	..
	8th Ave., New York, N. Y.	G.R.S.	..	12	..	..	..
N. & W.	Portsmouth, Ohio	Union	..	..	25	..	..
	Portsmouth, Ohio	Union	..	..	31	..	..
P. M.	Pelton, Ont.		20	..	..	..	..
S. P.	Dayton Ave., Los Angeles, Cal.	G.R.S.	..	28	..	..	..
Toronto Term.	Toronto, Ont.	G.R.S.	..	..	..	..	..
	John St.	G.R.S	..	169	..	..	..
	Scott St.	G.R.S.	..	169	..	..	..
	Cherry St.	G.R.S.	..	71	..	..	..
Totals	New	Plants 47					
		Levers 1,482	30	995	427	20	10
	Rebuilt, not listed in table	Plants 16	..	..	..	..	..
		Levers 79	..	74	..	2	3
	Grand Total—Levers	1,561	30	1,069	427	22	13

131. Thirty-one of these installations utilized 430 levers of the centralized non-interlocked type of simplified control and circuits, while on 100 installations 409 levers in interlocking machines or of the desk type were used. Over 1,517 controlled signals and 607 power-operated switches were included in these installations, equivalent

to 55 per cent of the number of switches so equipped in new regular interlocking during the year.

Good Prospects for 1931

At the close of 1930, construction was under way on 40 different signal installations on 15 roads, involving 475 miles of road and 1,199 signals. Interlocking construction is under way on 47 new plants, involving 1,482 levers, while 16 plants are being re-built, involving 79 additional levers. Remote control layouts and centralized control installations are under way at 27 points. These installations are scattered from Canada to Texas, indicating that construction programs are being pushed through to completion without regard to winter weather.

Twenty roads have already decided on signaling programs for 1931, the report of work contemplated including automatic signals on 1,843 miles of road, involving 2,625 signals. More than 46 new interlocking plants, involving 881 levers, are definitely planned for 1931. Also, over 30 remote control and centralized control installations involving 130 levers, 97 switches and 221 controlled signals, are planned for this year. Many roads have not yet completed their budgets for 1931, and other roads authorize installations individually as the need arises throughout the year. Several large interlockings and centralized control installations are being planned on which no definite data are now available.

Train Control Being Extended—
Cab Signaling More Popular

During 1930, the Michigan Central rebuilt the automatic signaling and provided automatic intermittent train stop on 108 miles of double-track line from Windsor, Ont., to St. Thomas, using 155 wayside inductors, and 69 locomotives were equipped with train-stop apparatus for operation on this territory. It is contemplated that the same construction will be extended from St. Thomas to Niagara Falls during 1931. During the year just past the Richmond, Fredericksburg & Potomac extended its train control and cab signaling on 9 miles of double track and the New York, New Haven & Hartford added such protection on 14.8 miles of third track. The automatic train stop was provided on the main tracks and electric locomotives of the Cleveland Union Terminal, which was placed in service in June, 1930.

During 1930, cab signaling without the automatic train control features was provided by the Pennsylvania on 112 miles of road, 464 miles of track, between Altoona,

Table F—Interlocking Plants Contemplated for 1931

Road	Location	Manufacturer	Working Levers: Mechanical	Electrical	Electro-Pneumatic	Elec. Mech.: Mech.	Elec. Mech.: Elec.
A. T. & S. F.	Streator, Ill.	Union	..	12	..	..	..
	Cleveland, Tex.		..	..	..	..	..
	Kountze		..	..	..	..	..
B. & O.	Leipsic Jct., Ohio		..	..	..	..	..
	Clifton Jct., N. Y.		..	..	..	..	..
	Laughlin Jct., Pa.		..	..	..	..	..
B. & M.	East Northfield, Mass.	Union	..	..	10	..	..
C. & O.	Fostoria, Ohio		..	..	..	..	..
	Carey, Ohio		..	..	..	..	..
C. & E. I.	Danville, Ill.		..	4	..	..	..
	Danville, Ill.		..	4	..	..	..
	Vincennes, Ind.		..	6	..	..	..
	Princeton, Ind.		..	2	..	..	..
	Evansville, Ind.		..	4	..	..	..
C. G. W.	E. Waterloo, Iowa		..	4	..	..	..
	W. Waterloo, Iowa		..	4	..	..	..
Erie	Corry, Pa.	Union	..	..	..	12	8
M-K-T	Sealey, Tex.	Union	..	11	..	..	..
N. Y. C.	Fostoria, Ohio	G.R.S.	..	68	..	..	..
	Armitage, Ohio		..	..	..	12	6
	N. Findley, Ohio	G.R.S.	..	2	..	..	..
N. Y. C. & St.L.	Thornton Jct., Pa.		..	..	..	..	..
	Painesville, Ohio		..	..	..	..	..
	Kimball, Ohio		..	..	..	..	..
	Portland, Ind.		..	4	..	..	..
	Alexandria, Ind.		..	..	..	10	6
	Linden, Ind.		..	..	..	..	..
	Lerna, Ind.		..	..	..	4	2
N. & W.	Bannon, Ohio	Union	..	..	34	..	..
	Valley Crossing, Ohio	Union	..	56	..	..	..
P. M.	Grand Rapids, Mich.		..	..	..	..	6
	Alma, Mich.		..	..	..	..	3
	Delray, Mich.		..	80	..	..	..
	Michigan Ave., Detroit, Mich.		..	68	..	..	..
	Elmdale, Mich.		..	..	..	8	8

Road	Location	Manufacturer	Working Levers: Mechanical	Electrical	Electro-Pneumatic	Elec. Mech.: Mech.	Elec. Mech.: Elec.
S. P.	San Jose, Cal.		..	68	..	..	..
S. P. L. & T.	Cleveland, Tex.		..	12	..	..	..
	Livingston, Tex.		..	..	..	3	1
	Kountze, Tex.		8	..	..	..	..
	Giddings, Tex.		..	4	..	..	..
T. & P.	Fort Worth, Tex.		..	147	..	..	..
	Texarkana, Tex.		..	15	..	..	..
U. P.	Cheyenne, Wyo.		..	35	..	..	..
	Kansas City, Kan.		..	43	..	..	..
	Topeka, Kan.		..	52	..	..	..
	Manhattan, Kan.		..	35	..	..	..
	New	Plants 46	..	..	..	..	..
Totals		Levers 881	8	740	44	49	40
	Rebuilt, not listed in table	Plants 48	..	..	..	..	..
		Levers 330	..	252	..	49	29
	Grand Total ..	Levers 1,211	8	992	44	98	69

Table G—Remote and Centralized-Control Installations Completed During 1930

	Location	Manufacturer	Number of Levers: Desk Type	Number of Levers: Centralized Type	Power Operated Switches	Number of Signals Controlled
A. T. & S. F.	Kinsley, Kan.	Union	19	..	12	21
	Holliday, Kan.	Union	..	16	6	13
	Olathe, Kan	Union	2	..	4	4
	Sibley, Mo.	Union	..	4	..	4
	Sand Creek, Kan.	Union	8	..	4	6
	Ralston, Okla.	Union	2	..	1	3
	Dewey, Okla.	Union	2	..	1	1
	Wellington, Kan.		1	..	..	2
	Dodge City, Kan.	Union	..	38	22	46
	Colorado Springs, Colo.	Union	4	..	3	5
	Fort Worth, Tex.		2	..	1	3
	Algoa, Tex.		2	..	1	3
	Alving, Tex.		2	..	1	3
	Joseph City, Ariz.	Union	3	..	1	3
	Winslow, Ariz.	Union	3	..	1	3
B. & O.	Piedmont, W. Va.	Union	..	..	2	4
	Altamont, W. Va.	Union	..	..	1	2
	Bond, Md.	Union	13	..	6	8
	Mt. Lake Park, Md.	Union	..	..	2	6
	Terra Alta, W. Va.	G.R.S.	..	..	2	6
	M. & K. Jct., W. Va.	Union	..	..	1	3
	Hardman, W. Va.	Union	..	..	4	7
	Heath, Ohio	Union	..	..	1	3
B. & M.	Lynn, Mass.	Union	13	..	11	13
	Swampscott, Mass.	Union	7	..	6	6
	Winchester, Mass.	Union	..	33	25	27
	Lowell Jct., Mass.	G.R.S.	6	..	8	13
	Saugus River, Mass.	Union	2	..	..	2
	Manchester, N. H.	Union	2	..	1	3
	Nunnery Hill, N. H.	Union	2	..	2	4
	Rockingham, N. H.	Union	2	..	1	3
	Newton Jct., N. H.	Union	4	..	2	6
	E. Portal, Mass.	G.R.S.	..	6	10	13
	Dover, N. H.	Union	2	..	1	3
	N. Chelmsford, Mass.	Union	9	..	6	10
	Fitchburg, Mass.	G.R.S.	..	30	37	41
	Gardner, Mass.	G.R.S.	..	24	39	64
	E. Deerfield, Mass.	G.R.S.	..	29	36	24
	Greenfield, Mass.	G.R.S.	..	23	41	48
C. N.	Yarmouth Me.	Union	2	..	..	8
	Danville Jct., Me.	Union	2	..	..	8
C. P.	Whitby, Ont.	Union	1	..	..	5
	Foster, Que.	G.R.S.	3	..	2	8
	Trois Rivieres, Que.	G.R.S.	..	12	7	23
	Agincourt, Ont.	Union	..	4	4	8
	Leaside, Ont.	Union	..	5	4	10
	Sault Ste. Marie, Mich.	Union	2	..	..	2
	Sault Ste. Marie, Mich.	G.R.S.	2	..	..	2
C. R. R. N. J.	North Branch, N. J.	Union	..	5	4	12
C. & N. W.	W. Nelson, Ill.	G.R.S.	11	..	7	12
	Green Bay, Wis.	G.R.S.	9	..	2	8
	Barrington, Ill.	G.R.S.	8	..	3	10
	DeVal, Ill.	G.R.S.	12	..	6	13
C. M. St. P. & P.	Fordson Jct., Minn.	Union	4	..	3	9
	Janesville, Wis.	Union	3	..	1	8
	Milton Jct., Wis.	Union	6	..	..	6
	Portage, Wis.	Union	7	..	7	11
	Savanna, Ill.	Union	5	..	4	8
	Sturtevant, Wis.	Union	4	..	3	7

Road	Location	Manufacturer	Number of Levers: Desk Type	Number of Levers: Centralized Type	Power Operated Switches	Number of Signals Controlled
C. R. I. & P.	Gresham, Ill.	G.R.S.	..	..	1	3
	Herington, Kan.		8	..	..	8
C. St. P. M. & O.	Hudson, Wis.	G.R.S.	3	..	..	6
D. & H.	Glenville Jct., N. Y.	G.R.S	4	..	3	9
	Windsor, N. Y.	G.R.S.	..	11	6	22
Erie	Waugam, Pa.		2	..	1	3
	Coles, Ohio		2	..	1	3
	Stoney Pt., Pa.		2	..	1	4
	Union City, Pa.		2	..	1	4
G. N.	Carlton, Minn.	G.R.S.	5	..	3	8
	Cut Bank, Mont		6	..	2	9
	Benson, Minn.	G.R.S	2	..	1	4
	Everett, Wash.	G.R.S.	2	..	1	4
I. C.	Ashkum, Ill.	G.R.S.	..	6	10	24
Me. C.	Bangor, Me.	Union	3	..	1	4
M. St. P. & S. S. M.	Superior, Wis.		1	..	1	4
	Schiller Park, Ill.		1	..	1	4
M-K-T.	Temple, Tex.	Union	2	..	1	3
	Vinita, Okla.	Union	2	..	1	3
	Nevada, Mo.	Union	2	..	1	3
	Fort Scott, Kan.	Union	2	..	1	3
M. P.	Allenton, Mo.		..	10	8	20
	Diaz, Ark.		..	12	5	24
	Atchison, Kan.		..	3	..	10
N. Y. C.	Poughkeepsie, N. Y.	G.R.S.	14	..	5	17
	Dunkirk, Ohio	G.R.S	..	3	1	3
	Campbell, Ill.	G.R.S.	..	2	..	2
	Ridgeway, Ohio	G.R.S.	..	3	1	3
O. C.	Centerburg, Ohio	G.R.S.	..	2	2	6
	Stanley, Ohio	G.R.S.	..	1	1	3
C. C. C. & St.L.	Glenn, Ind.		..	..	2	8
	Hazelrigg, Ind.	Union	..	..	2	8
	Dale, Ind.	Union	..	..	2	8
	Colfax, Ind.		..	..	1	4
M. C.	Rochester, Mich.		..	..	..	6
N. Y. C. & St. L.	Vermilion, O.	Union	2	..	1	4
	Hobart, Ind.	Union	2	..	1	4
	Payne, Ohio	Union	4	..	2	8
	Tipton, Ind.		2	..	..	..
N. P.	Garrison, Mont.		5	..	2	7
	Austin, Mont.		1	..	1	3
	Skyline, Mont.		1	..	1	3
N. & W.	Stonecoal, W. Ca.	Union	2	..	1	4
Penn	Frenchtown, N. J.	Union	4	..	2	5
	Glen Union, Pa.	Union	2	..	1	3
	Hyner, Pa.	Union	2	..	1	3
	Lock Haven, Pa.	Union	2	..	1	3
	Enola, Pa.	Union	7	..	4	6
	Buttonwood, Pa.	Union	6	..	1	4
	Perryville, Md.	Union	4	..	2	6
	Landover, Md.	Union	2	..	1	3
	Perryman, Md.	Union	4	..	2	6
	Wilmington, Del.	Union	6	..	5	6
	C. H. Tower, Pa.		..	..	5	7
	W. V. Tower, Ohio		..	..	3	7
	Mohican, Ohio		..	7	6	7
	Berlin, Ind.	Union	..	8	4	12
	Lafayette, Ohio	Union	..	4	2	6
	Delphos, Ohio	Union	4	..	2	6
	Ridgeville, Ind.	Union	..	..	4	8
	Aynes, Ind.	Union	..	..	2	6
	Toledo, Ohio	Union	4	..	3	5
	Toledo, Ohio	Union	3	..	..	5
	Xenia, Ohio	Union	..	4	2	4
	Xenia, Ohio	Union	7	..	6	6
	New Castle, Ind.	Union	3	..	1	3
	Limedale, Ind.	Union	..	23	12	32
	Limedale, Ind.	G.R.S.	..	..	1	3
P. M.	Grandville, Mich.	Union	1	..	1	4
S. A. L.	Southern Pines, N. C.	Union	4	..	2	6
	McKenney, Va.	Union	4	..	2	6
	Wake Forest, N. C.	Union	4	..	2	6
	Moncure, N. C.	Union	4	..	2	6
	Sanford, N. C.	Union	2	..	1	3
	Cameron, N. C.	Union	4	..	2	6
	Aberdeen, N. C.	Union	4	..	2	6
	Apex, N. C.	Union	6	..	3	9
	Hamlet, N. C.	Union	2	..	1	3
	Monroe, N. C.	Union	2	..	1	3
S. P.	ElPinal to Brighton, Cal	Union	..	50	23	178
	Biola Jct., Cal.	Union	5	..	5	13
	Cliff, Cal.	Union	5	..	2	16
	Brighton to Elvas, Cal.	Union	9	..	6	26
T. & L.	Sanderson, Tex.	Union	2	..	1	6
	Dayton, Tex.	Union	4	..	2	12
	Alpine, Tex.	Union	..	12	6	36
T. & P.	Whitesboro, Tex.	G.R.S.	1	..	1	7
	Dallas, Tex., to E. Grand Prairie	G.R.S.	..	..	10	31
U. P.	Gibbon, Neb.	Union	5	..	4	7
	Julesburg, Colo.	Union	4	..	3	8
Wabash	State Line, Ind.	Union	..	40	15	50
Totals	∫Plants		109	31		
	∫Plants		100	31	..	..

Pa., and Pittsburgh. This is another step in the Pennsylvania's program to provide cab signaling on heavy traffic lines. On December 20, a hearing was held before the Interstate Commerce Commission with reference to a petition of the Pennsylvania to operate over train control territory, locomotives equipped with the continuous system of four-indication cab signals, but not with train-stopping devices.

The Bureau of Safety of the Interstate Commerce Commission has made rapid progress during 1930 in making final inspections and re-inspections of installations of train control required under previous orders. Twenty of the carriers noted in the different orders have been advised that their installations, as now arranged, substantially meet the requirements of the commission.

Table I—Highway Crossing Protection Completed During 1930

Road	Wig-Wag	Flashing Lights	Automatic Gates
A. C. & Y.	11	4	..
		8¶	
A. A.	..	6	..
A. C. L.	..	12	..
		4†	
B. & O.	..	225	..
Ba. & Ar.	3	..	..
B. & L. E.	..	7	..
B. & M.	..	48	..
B. R. & P.	..	20	..
C. N.	22	19	..
C. P.	16	..	..
C. of G.	..	2	..
C. N. J.	..	6	..
C. V.	..	7	..
C. & O.	..	90	..
C. & N. W.	151	49	..
C. & E. I.	..	22	..
C. B. & Q.	..	28	..
C. G. W.	..	4	..
C. N. S. & M.	..	..	42
C. R. I. & P.	..	15	..
C. I. & L.	..	1	..
D. & H.	..	27	..
D. L. & W.	..	36	..
D. & R. G. W.	..	10	..
D. T. & I.	..	12	..
E. J. & E.	..	34	..
Erie	..	153	..
Ft. W. & D. C.	..	6	..
G. N.	..	15†	..
G. M. & N.	..	8	..
I. C.	..	80	..
K. C. S.	..	2	..
K. & I. T.	..	4	..
L. V.	..	40	..
L. & N.	..	30	4
M. St. P. & S. St. M.	1	38†	..
M-K-T	..	42	..
M. P.	..	30	..
M. & O.	..	9	..
N. C. & St. L.	..	40	..
N. Y. C.	..	240	..
C. C. C. & St. L.	..	28	..
P. & E.	..	2	..
M. C.	34	136	..
I. H. B.	..	7	..
P. & L. E.	..	4	..
Rutland	..	2	..
N. Y. C. & St. L.	..	54	..
N. Y. N. H. & H.	..	16	..
N. Y. O. & W.	..	1	..
N. & W.	27	..	..
N. P.	..	33†	..
P. E.	23	..	..
Penn.	..	492	..
P. M.	3	17	..
Reading	..	37	..
St. L.-S. F.	1	28	..
S. A. L.	..	60	..
		12†	
S. P.	98	11	..
T. & L.	12	4	..
T. & P.	..	94	..
U. P.	15	16	..
Wabash	2	40	..
W. P.	4	..	..
W. & L. E.	22	10	..
	445	2,537	54

† = Revolving disc with flashing lights.
¶ = Colored traffic light signals.

Table H—Car Retarder Installations Completed During 1930

Road	Location	No. of Classification Tracks	No. of Towers	No. of Retarders	Rail Ft. Retarders	No. of Power Switches	No. of Switch Signals	No. of Power Skates	Manufacturer
Erie	Marion, Ohio, Westbound	24	2	17	1,309	24	..	..	Union
L. V.	Oak Island, N. J., Eastbound	38	2	20	1,353	37	37	38	G.R.S.
	Oak Island, N. J., Westbound	15	2	14	1,045	14	14	15	G.R.S.
N. Y. C.	Gardenville, N. Y.	31	3	20	1,540	30	30	31	G.R.S.
R. F. & P.	Potomac, Va., Northbound	46	2	27	1,727	48	..	46	Union
Total		154	11	98	6,974	153	81	130	

In the case of 13 other carriers some minor exceptions were made, attention being called to desired changes in maintenance practices, to lack of protection at crossings of other carriers, to certain special equipment used on motor cars, etc. Eleven carriers have yet to receive final reports, although the reports of two or three are ready for consideration by the Bureau of Safety.

Since July, 1929, the roads have furnished the commission with data with reference to the performance of train control equipment and a summary of this information was printed in the annual report of the Bureau of Safety for the fiscal year ending June 30, 1930. In brief it may be said that these reports indicate that as a whole train control equipment which was developed and installed in a comparatively few years is rendering very satisfactory performance that may be compared favorably with that of other standard signaling apparatus.

No orders requiring any general installations of train control are expected to be issued in the near future. However, it has been made evident that the commission has not forgotten the subject of train control. In fact, in reports covering investigations of certain train accidents, definite reference is made to the satisfactory stage to which train control has developed, and of the reliable performance of the apparatus in service, and in addition suggestions are made that the carrier consider the installation of additional protection over and above the existing automatic block signals.

Competition Stirs Railways

(Continued from page 44)

with Michigan Central trains for New York and other eastern destinations. This service is on a 44 hr. 30 min. basis between New York and Spokane.

Air-rail developments may also be expected in Canada, following the joint purchase of an interest in the two principal Canadian air transport companies by the Canadian National and the Canadian Pacific.

The year also witnessed the inauguration of a number of air lines that have no connection with the railways, and supply another source of direct competition. These have met with varying success. The oustanding example is the line operated on an hourly schedule between New York and Washington. At last reports, this line was operating at about 75 per cent capacity; in other words, taking about 150 passengers a day from the railways.

Meeting Truck Competition

The long-distance motor truck continues on its merry way, impeding traffic and smashing up the roads for which the railways' taxes must pay. Each year witnesses the truck in a new field of traffic. This year the cotton growers have become infested with "truck fever." Trucks loaded with cotton are moving out of the Southwest for long distances (Texas to Denver, Colo., for example) and returning with full or partial loads which are hauled for any rate they can get, in order to avoid an empty backhaul. In certain sections of the Southeast, short lines which have depended upon cotton traffic for a large portion of their revenues have suffered heavy losses from competing trucks operating on highways paralleling their railways. The railways are attempting to meet the situation by as nearly perfect service as it is possible to give.

Freight service this year, judging from the statistics available of a number of the principal roads, has been better than ever before. Most of the freight train "on-time" performances rival passenger train performance, and this at a time when freight trains are scheduled faster than ever before.

It is likely that the next few years will see the railways on a parity with the trucks in the one important advantage possessed by the trucks, that of store-door delivery. Within the past month the Chicago & North Western has inaugurated container car service between Chicago and Milwaukee, Wis., offering four types of service, one of which includes complete handling of a shipment, from the setting down of the empty container at the shipper's door to the delivery of the loaded container at the consignee's door at destination. This service was started in a highly competitive territory, in which an electric line already has in operation a successful store-door delivery service. Elsewhere in this issue, the store-door delivery developments of the year are traced in detail. They represent one of the most highly significant factors in the transportation competition of recent years.

The operation of night locals has become increasingly important. These are run for distances up to 250 miles out of jobbing centers, the crews being provided with lights and freight house keys. The radius of the night local is being extended even further on some roads, which run "set-out" trains for considerable distances, these trains setting out cars of merchandise at the principal stations during the night, which are picked up and "peddled" to the smaller stations by early morning locals.

Roads as far apart as the Texas & Pacific, the Pere Marquette, and the Great Northern are experiencing marked success in the operation of these night locals. The desirable feature of building up traffic in this way is that the additional traffic secured is retrieved from the truck lines, and not taken away from another railway.

The year 1930 was hardly one from which normal comparisons could be drawn. There were, however, certain indications that the railways are alive to the necessity of solidarity of effort; that they were realizing the greater promise of directing their activities toward the winning back of business from other agencies of transportation, rather than from competing railways. The old spirit of traffic warfare between competing lines is too deep-rooted to vanish entirely over night, but the realization is gradually coming that undue competition is ruinous and playing directly into the hands of the coach and truck lines, waterways, etc., which already possess quite a sufficient number of advantages.

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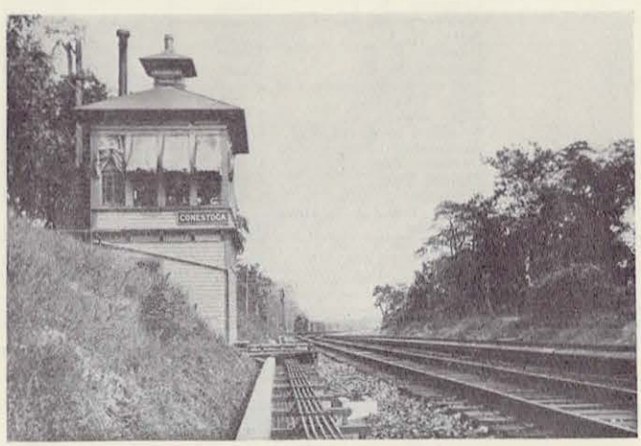


A Pennsylvania Freight Train Approaching Conestoga, Pa., from the East

Communication Service Improved During 1930

Printer operations extended—Train telephones on Canadian National

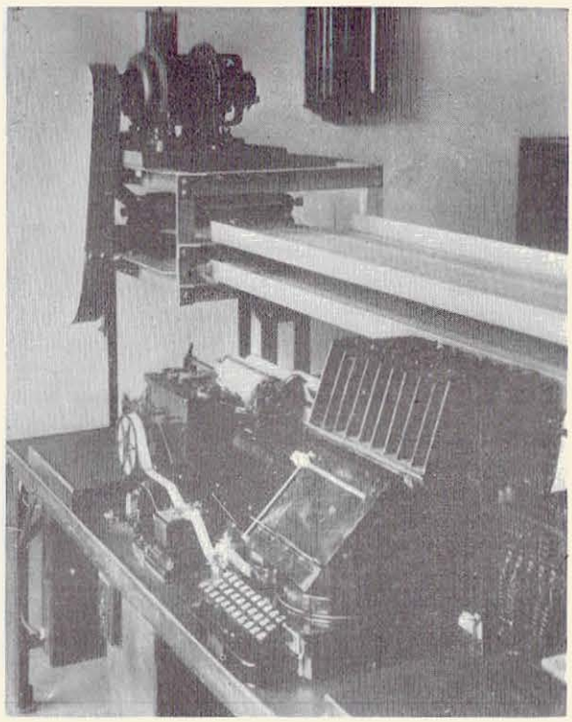
By S. R. Hamilton
Associate Editor, Railway Age

IMPROVEMENT in service in both the telegraph and telephone fields characterized the communication facilities on the railroads of the United States and Canada in 1930. Expedited messenger service, improved office methods, stricter censoring of messages, ticketing of long-distance telephone calls, and the more intensive utilization of existing plant and line facilities resulted in a general improvement of communication service. Reconstruction of pole lines continued at a good rate during 1930, although there was a reduction in the mileage of new lines constructed, the total of new and rebuilt lines completed during the year being 9,024 miles, as compared with 11,519 miles for 1929. Copper wire installations, totaling 43,503 miles, while not up to the record figure of 54,890 miles for 1929, were nevertheless higher than in 1928. This mileage was divided almost evenly between railroad-owned and commercially-owned installations.

Table A—Principal Increases in Plant Facilities During 1930, as Compared with 1929 Increases

		1930	1929
Miles of new or rebuilt pole lines:			
Railroad owned	2,347		
Commercial	3,687		
Jointly Owned	2,990		
Total		9,024	11,519
Mileage of new copper wire:			
Railroad owned	22,435		
Commercial	21,068		
Total		43,503	54,890
Increase in miles of road dispatched by telephone		2,690	4,424
Increase in miles of long-distance telephone circuits		6,583	
New mileage of telegraph circuits, all types		16,192	
Increase in miles of printing telegraph circuits		6,857	8,425
Number of new printing telegraph machines		156	188

The telephone continued to displace the telegraph for train dispatching, although at a reduced pace, the increase for 1930 being 2,690 miles as compared with 4,424 miles in 1929. With the exception of 103 miles of unimportant branch lines, the New York, Ontario & Western is now entirely dispatched by telephone, while every division of the New York, New Haven & Hartford has been telephone-dispatched since 1927. The Big Four has telephone dispatching on 95 per cent of its lines, with telephone service to practically all stations, the only telegraph service being between some way stations and between relay offices. The Missouri Pacific contemplates an increase of 257 miles of telephone train dispatching for 1931. The mileage of telegraph circuits completed in 1930 totals 16,192, at least 1,300 miles representing circuits which were derived by simplexing existing circuits. The principal changes in plant facilities made in 1930 are outlined in Table A. This table obviously reflects the present general business condition of the country but not without a note of optimism if we take into consideration the factors that were involved in the record expenditures made in 1929.



Printers and Belt Conveyors for Messages are Features of Modern Telegraph Offices

A very interesting and important installation of two-way commercial telephone service between moving trains and a fixed office was made on the Canadian National. This road has experimented with this development for some time, but, prior to the recent installation, had not established a commercial service in connection with the Bell telephone system. The initial installation was placed in service on April 27, 1930, on the more important passenger trains between Toronto and Montreal. A description of this installation was published on page 1053 of the *Railway Age* for May 3, 1930.

Table B—Principal Copper Wire Installations Completed in 1930

Railroad	Miles of New Copper Wire: Railroad Owned	Commercial	Total
S. P. (System)	1,356	4,635	5,991
A. T. & S. F. (System)	2,789	2,640	5,429
C. P.	3,555	1,798	5,353
Penna.	4,546	608	5,154
N. P.	107	3,020	3,127
M. P. (System)	1,935	1,087	3,022
C. N.	1,098	1,130	2,228
Erie	1,092	1,125	2,217
U. P. (System)	817	1,061	1,878
N. Y. C. & St. L.	181	658	839
C. & O.	661	150	811
Wabash	64	615	679
P. M.	397	233	630
C. of G.	265	257	522
N. O. G. N.	380	130	510
G. N.	495	—	495

The success of front- to rear-end communication on long freight trains has been satisfactorily established, although to date no permanent licenses have been issued by

the Federal Radio Commission for the use of the channels that were assigned to the experimental installations made both on the Chesapeake & Ohio and the New York Central.

Both the Canadian National and the Canadian Pacific are increasing their installations of carrier-current telegraph. The Canadian National has 60 two-way channels of high-frequency carrier similar to that used in the Bell system. Wire-carrier systems have enabled them to make more intensive use of existing wire facilities than would otherwise have been possible. Perhaps the most significant fact, from a technical standpoint, is the freedom from earth currents, better known as the "Northern Lights," afforded by such installations.

Printer Service Extended

As shown in Table C, printers continued to displace Morse telegraph service and classification yard messengers. The number of such facilities completed in 1930 was nearly equal to that of the previous year, while the number of roads involved was greater.

Table C—Telegraph Printer Installations Completed in 1930

Road	Miles of Circuit	Number of Machines
C. P.	1,410	42
Penna.	1,619	35
A. T. & S. F. (System)	1,634	22
C. M. St. P. & P.	20	13
N. Y. C. (System)	1	10
L. V.	0.5	6
S. P. (System)	—	6
M. P. (System)	11	4
C. & O.	429	4
B. & O.	219	4
C. R. I. & P.	668	2
D. T. & I.	1	2
M. St. P. & S. S. M.	452	2
N. P.	181	2
S. A. L.	212	2
Totals	6,857.5	156

The Canadian Pacific completed an installation of 1,410 miles of printer circuit with 42 machines, the Pennsylvania 1,619 miles with 35 machines, and the Atchison, Topeka & Santa Fe 1,634 miles with 22 machines. The Minneapolis, St. Paul & Sault Ste. Marie, which has not heretofore engaged extensively in this work, installed 452 miles of printer circuit with 2 machines. A telegraph printer communication system having 2 sending-receiving machines and 14 receiving machines was installed at the new Cleveland Union terminal for the purpose of announcing trains and transmitting orders for coach movements.

Early in 1930, the Pennsylvania completed the installation of printers in its Chicago office so that all message traffic is now handled by printer service, to the exclusion of Morse telegraph, between Chicago and important points in the Western region, as well as to Pittsburgh, Pa., and Philadelphia, and to New York.

Under Construction at Close of Year

At the close of the year the amount of work under way included the construction or reconstruction of 2,085 miles of pole line and the installation of 1,881 miles of new copper wire, a large part of which will be used on 553 miles of long-distance telephone circuits. The Atchison, Topeka & Santa Fe, the Southern Pacific, the Union Pacific, and the Chicago, Burlington & Quincy are extensively engaged in winter construction.

Table D—Yearly Comparison of the Installation of Printing Telegraph Circuits and Machines

Year	Miles of Printer Circuit	Number of Machines
1925	3,462	No data
1926	6,512	No data
1927	12,300	96
1928	7,125	59
1929	8,425	188
1930	6,857	156

It is hazardous to draw conclusions from the data relating to work contemplated for 1931. Many roads report that budgets have not yet been completed, while others state that their plans are indefinite. For the most part the estimates are lower than were the corresponding estimates last year. However, an increase is noted in the case of the proposed construction or reconstruction of pole lines, a total of 9,741 miles of such work being contemplated for 1931, while that contemplated a year ago for 1930 was only 9,616 miles.

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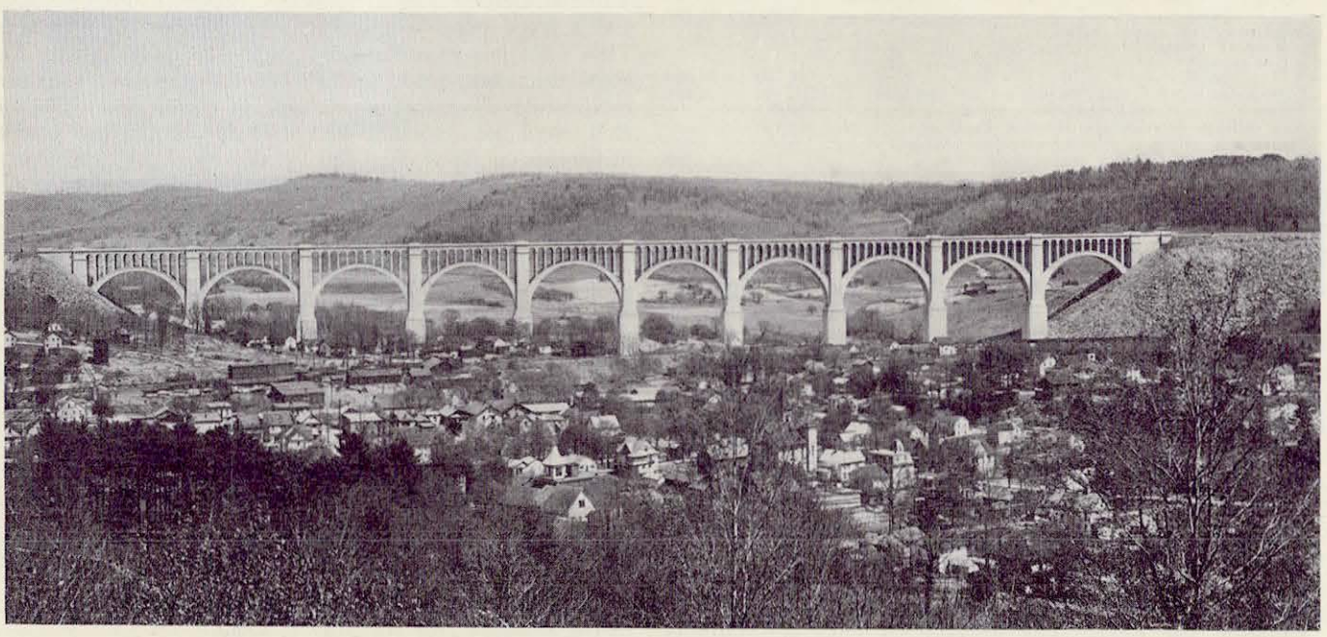
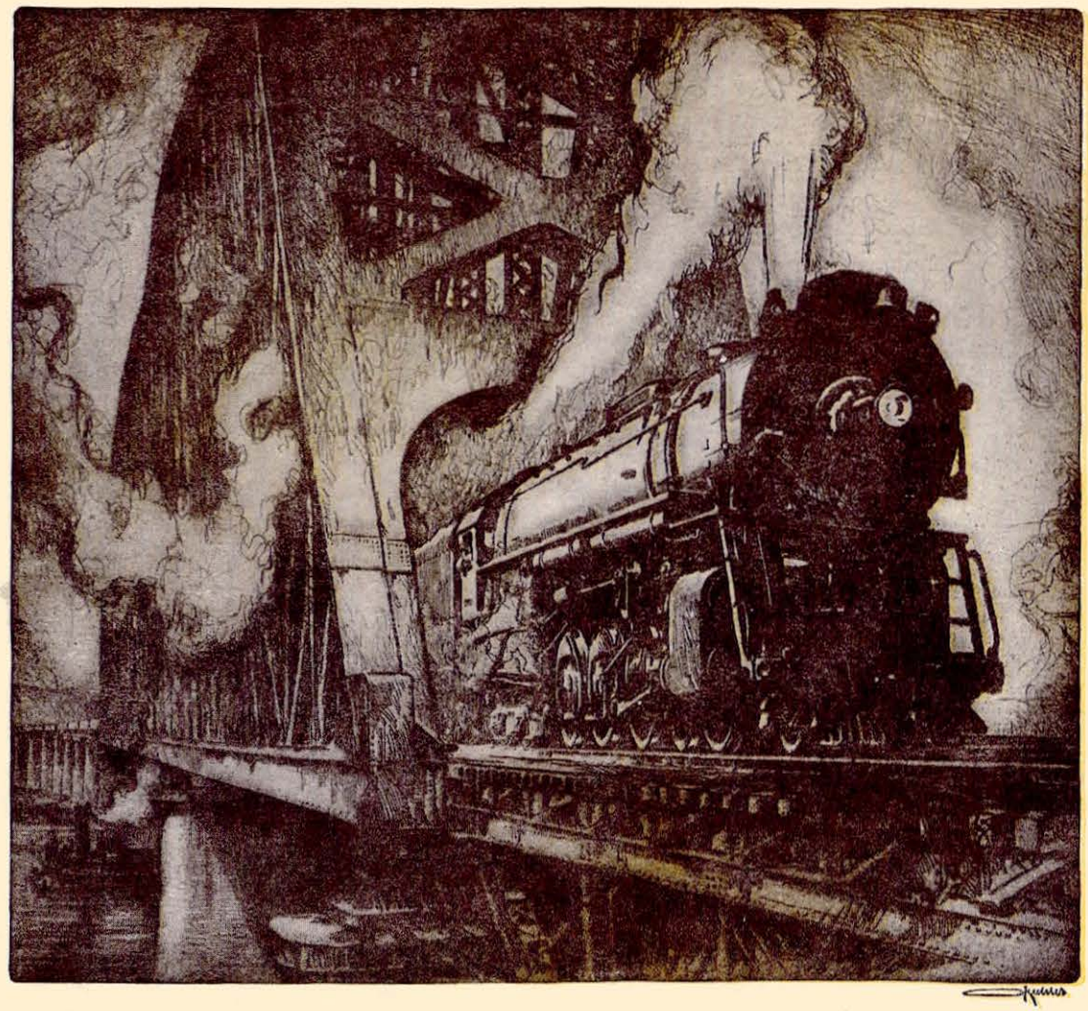


A New View of the Delaware, Lackawanna & Western's Tunkhannock Viaduct, the Largest Structure of Its Kind in the World—Comparison with the Village of Nicholson, Pa., in the Valley Below, Emphasizes Its Tremendous Size

Foreign Railways Section Begins on Second Right Hand Page Following



"POWER"

LIMA LOCOMOTIVE WORKS INCORPORATED

LIMA LOCOMOTIVE WORKS, INCORPORATED LIMA, OHIO

The Locomotive of Tomorrow Must Have Greater Power . . .

"Speed, the saving of time, is what business wants. Locomotives of tomorrow must, if successful in competitive struggle, meet this demand. More power and greater speed are first necessities."

R. H. AISHTON, *President*
American Railway Association,
September, 1930.

ONLY by using locomotives that provide this higher power economically can the earnings of railroads be raised to new high levels.

"Super-Power Principles" have so intensified power production that the simple, ten-coupled, two-cylinder locomotives recently built by Lima for the Chesapeake and Ohio Railway Company exceed the power of simple Mallets. Intensive power production in a two-cylinder unit thus reduces both operating costs and maintenance.

These latest additions to the ranks of modern power are replacing locomotives of an average age of less than ten years.

It is the railroads with the greatest proportion of such modern power that prosper.

LIMA LOCOMOTIVE WORKS, INCORPORATED LIMA, OHIO

Switzerland

Railways Abroad

Continuing the plan inaugurated with the 1930 Annual Statistical Number, the *Railway Age* again presents herewith its broadened annual survey of foreign railways. Prior to 1929, as pointed out in this article last year, it was the policy of the *Railway Age* to select four or five of the larger and more important foreign countries for consideration in extended articles on railway developments in them during the year under review. The present plan is an attempt to present a brief but comprehensive discussion of railway developments throughout the world. Contributions to the accompanying compilation were accordingly solicited from representative railway authorities in each of approximately 30 countries. A short summary of important recent railway developments was requested together with a statement of predictable prospects. The replies received from more than 20 countries are published in the following pages. In the cases of some important countries, where replies were wanting or unduly delayed, it became necessary to prepare a summary on the basis of the latest statistics and other information on their railways available in this country.

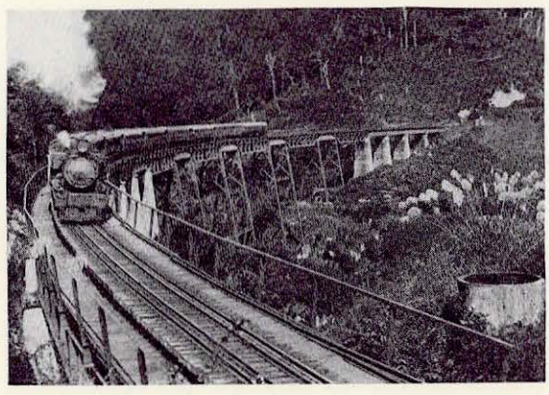
While many of the railway problems discussed by our correspondents are peculiarly localized to the individual countries involved, it will nevertheless be seen that two difficulties confronting railways at the present time—the effect of the business depression and competition from other forms of transport—are generally prevalent. These two features of the present railway situation were discussed in practically every article received; they seem to stand out as the developments which more than anything else transcend peculiarly local conditions and thus might be designated as two of the more important problems of the railway world during 1930.

Great Britain

The world-wide industrial depression has left its mark on British railways. At a stage in their history when, having overcome the aftermath of highway competition, there were prospects of the war, railway amalgamations and intensive steady prosperity, decreasing business spread like a plague leaving in its wake a state unparalleled within living memory.

From the beginning of the year revenues from all classes of traffic—passenger, merchandise and heavy freights—began to fall with the result that at its close the railways were some 10 million pounds short of their 1929 revenue, or 15

New Zealand



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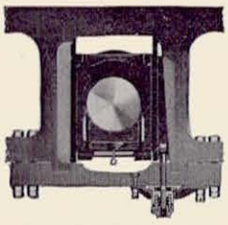
MORE INTENSIVE POWER PRODUCTION

Franklin Steam
Grate Shaker

The LIMITED *Cut-off*



Franklin Adjustable
Driving Box Wedge

Franklin Power
Reverse Gear

THE success of Super-Power Steam Locomotives in hauling greatly increased tonnage at higher speeds has been due to their more intensive production of power.

To high horsepower, the goal of modern design, Franklin has contributed many elements. These have been coordinated in the construction of the Super-Power Locomotive.

For free steaming on long runs, a clean fire admitting air thru the grates is a necessity. Franklin Steam Grate Shaker makes it physically easy for the fireman to keep the fire in better condition to produce more steam.

Draw bar pull at any speed is dependent upon cut-off. Franklin Power Reverse Gears make it easy for the engineer to secure and to retain just the right cut-off and thus conserve steam. These gears won't creep and are made for either wheel or lever operation.

While steaming capacity controls operation at speeds, starting power limits the size of train that can be hauled. The Locomotive Booster raises this limit by cutting in with thousands of pounds of tractive effort in starting, at slow speeds, and in any tight place.

Another important capacity increaser is The Limited Cut-Off which compels the expansive use of steam at all times, thereby reducing steam consumption from 10 to 30%. It also reduces the maximum variation in torque which permits using a lower factor of adhesion and secures more power in starting. By giving 25 to 50% increased port opening, The Limited Cut-Off also increases power at speeds.

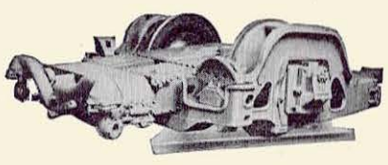
For transmitting the greater piston thrusts of the Super-Power locomotive the Tandem Main Rod Drive was developed. By distributing the thrust over four main pins it keeps bearing pressures low, reduces maintenance and increases dependability of operation.

The Franklin Adjustable Driving Box Wedge automatically adjusts itself with every turn of the wheel and protects the locomotive's foundation. This is a requirement for lower maintenance and increased service.

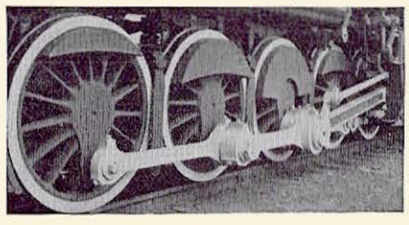
Franklin Driving Box Lubricator and Spreader insures cool driving boxes however fast or far the locomotive runs. Recent improvements simplify re-packing and make parts interchangeable.

FRANKLIN RAILWAY SUPPLY CO., INC.

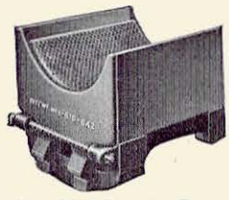
NEW YORK CHICAGO SAN FRANCISCO ST. LOUIS MONTREAL



The Locomotive Booster



Tandem Main Rod Drive



Franklin Driving Box Lubricator and Spreader

million pounds below the standard return they are permitted to earn.

Still further operating economies were effected, but the roads declined to exercise their rights to raise their rates, or in any way to interfere with the agreements in regard to wages and conditions of employment until the expiration of the latter towards the end of November. Negotiations with the unions are now in progress.

Difficult though the year has been the railways have pursued a steady program of improvements during the critical time. This policy has resulted not only in capital expenditures on new projects totalling over £30,000,000 but has given much work to large numbers of unemployed. These projects which have as their foundation the increasing efficiency of the British railways, include electrification of suburban lines, the quadrupling of congested sections of the main line, rebuilding of important passenger and freight stations, the enlargement or construction of new classification yards, locomotive terminals, etc., and improvements at railway-owned docks.

On the operating side there was considerable development. By the middle of the year an agreement had been reached with practically every important motor coach operator in railway territory and the first fruits of this rail and road co-ordination became evident with the introduction of combined rail and highway services. Luxury travel developed a step further in both day and night rail coaches and some new steamers were introduced on cross-Channel services. Highway freight operations, including collection and delivery and country lorry and general services, were extended and introduced to cover the entire country, while unremunerative branch lines and stations were closed and highway services substituted.

When the tide turns to prosperity, as inevitably it must, the British railways will be in a position to afford a better, quicker and cheaper service than ever before.

W. H. Fraser.

France

Railways of France, mainly because of increased operating costs attending advances in wage scales and augmented payments into social insurance funds, faced a serious deficit for 1930. Rising prices for materials also had an adverse effect on prospective profits while the business depression tended to reduce traffic. The recession on account of this latter, however, was less severe in France than in other European countries. The deficit in the 1930 Common Fund will call for decisive action on the part of the government—either rates must be increased, or taxes reduced, or an advance made from the national treasury to balance the deficit. This Common Fund is a plan whereby all profits of French railways are pooled; dividends are guaranteed by the state and deficits of the weak lines are met out of profits of the financially strong. At the close of 1929 there was a substantial deficit in this Common Fund; the procedure, under the Railways Act, in such a case, is to increase rates. Recent advances in rates became effective in August, 1929, and January, 1930, and public sentiment is now hostile to another increase. Hence the suggestion of alternatives, such as a reduction in railway taxes or an advance from the state. Taxes at present amount to about 32½ per cent on passenger fares and 10 per cent on freight rates.

Despite this financial situation the French railways projected several capital improvements during 1930. Among these was the completion of a large classification yard by the Northern at Le Bourget, a $7,800,000 program of enlargement at the Eastern's Paris facilities and the general program of the State Railways involving an expenditure of $10,998,000. The Paris, Lyons & Mediterranean is four-tracking between Paris and Dijon and electrifying its line between Culoz and Modan. Another important development is the standardization of signaling. This plan, which has been approved by the Minister of Public Works, will be worked out over a five-year period; it involves the substitution of electrical for mechanically-operated signals with light signals for both day and night operation.

Service improvements during the past year include the introduction of several new trains. The Paris, Lyons & Mediterranean has installed the "Cote d'Azur Pullman Express," a companion to its famous "Blue Train" and "Paris-Mediterranean Express," between Paris and points along the French Riviera. The Eastern now has three non-stop runs between Paris and Nancy, 219 miles: three between Troyes and Belfort, 171½ miles, and five between Paris and Bar-le-Duc, 157½ miles. The State Railways operate the 177½ miles between Paris and Saumur as a non-stop run. In Paris these government lines have recently substituted motor trucks for horse-drawn vehicles in their collection and delivery services. A saving of about $40,000 a year is expected to result from the substitution.

Germany

The new railroad law prescribed by the Young Plan went into effect on March 13, 1930, and caused the following changes in the railroad law of August 30, 1924:

1. Removal of all foreign participation in the management of the German State railways, including that of the foreign members of the board of directors, of the trustees, of the railroad commissioner, of the reparation commission and of the international arbitrator;
2. Strengthening of the powers of the federal government;
3. Abolition of the reparations debt prescribed in the Dawes Plan, and of the reparations mortgage, and the introduction instead of a special direct tax with special guarantees and privileges.

In the form of this reparations tax the German State Railway Company must add 660,000,000 marks ($157,212,000) annually in monthly installments to the reparations payments. With regard to the transportation tax, from which the company hitherto has had to pay a total of 290,000,000 marks to the reparations agent, the federal government now has a free hand as to whether it wants to increase this tax, decrease it, or set it aside entirely. As long as the financial situation of the nation does not permit the abolition of the transportation tax, the burden of the German State Railways for reparations purposes is, therefore, not lessened. An improvement in their financial situation is only to be seen in that the legal burden of the reparations mortgage on State Railway property has been lifted, and through this the credit situation of the railways has been improved.

The marked reduction in traffic, which must in part be ascribed to the world economic crisis and in part to competition from motor vehicles, has resulted in an ever-growing decrease of income, which could not be offset by rate increases in the city and suburban traffic of Berlin and Hamburg, and by slight increases in package freight, express and passenger rates. The total reduction in receipts as compared with the year before, came, at the end of August, to 468,500,000 marks, and increased still more in the ensuing months.

In view of this situation, it will only be possible for the State Railways to cover their expenditures during the fiscal year of 1930 by drawing on their reserves or through retrenchments. Out of the international 5½ per cent loan to the German nation, 250,000,000 marks were taken up, and a further internal loan of 150,000,000 marks was negotiated through issuing 6 per cent State

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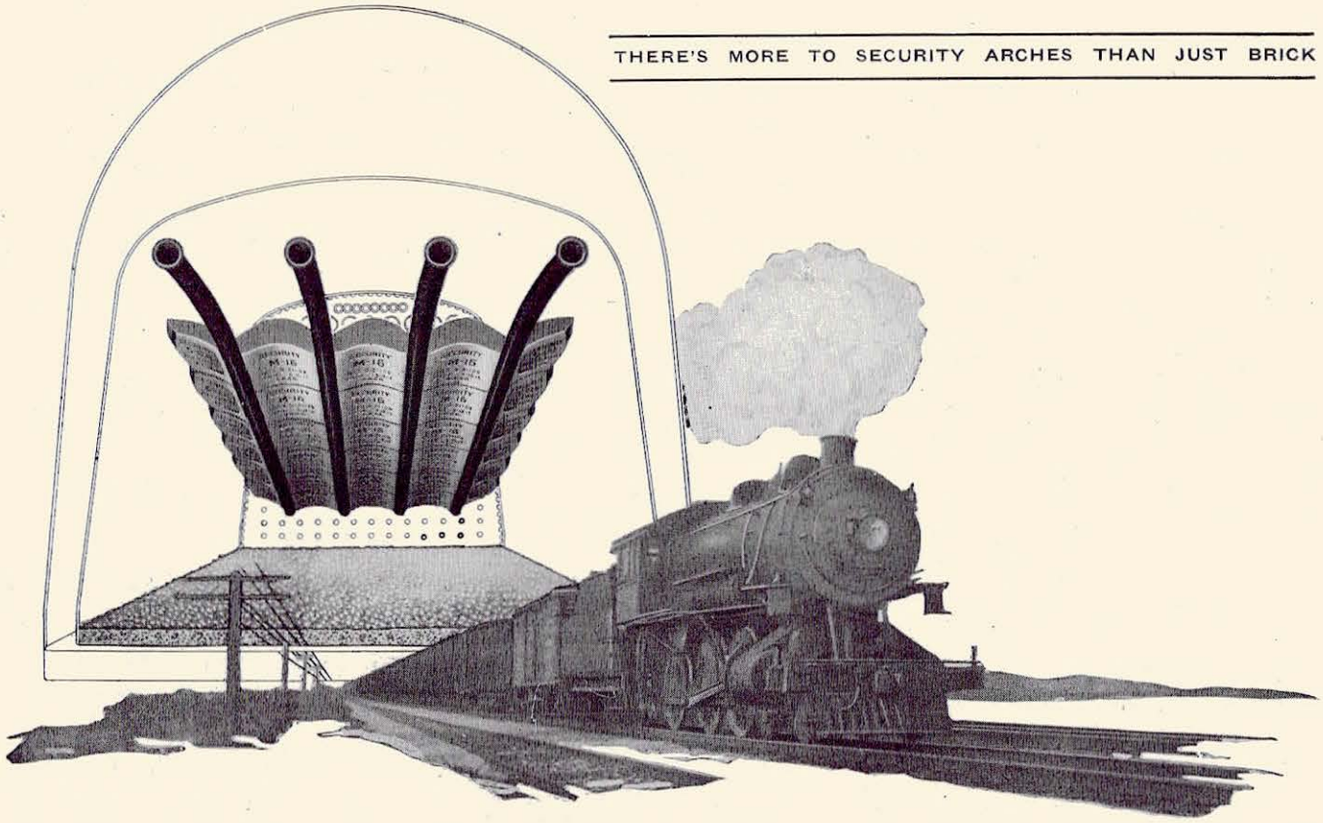
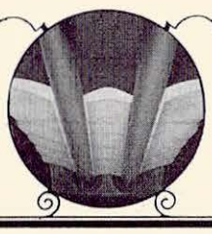
THERE'S MORE TO SECURITY ARCHES THAN JUST BRICK



THE LOCOMOTIVE
Is Not Just a Bunch of Steel

- The locomotive is more than just a collection of some thousands of pounds of steel.
- It is a highly developed mechanism upon which has been expended the finest brains of the engineering profession.
- The locomotive Arch, too, is more than just a pile of brick and a few tubes. Its present high state of development is the result of years of concentration by engineers of American Arch Company.
- Their efforts brought it from the crude stud-supported slabs to the sectionalized tube or syphon supported Arch you know today. Its development is constantly pursued by American Arch Company who thus contribute an important service to the railroads of the country.

Harbison-Walker Refractories Co.
Refractory Specialists



American Arch Co.
INCORPORATED
Locomotive Combustion Specialists

Railway bonds. This latter loan was made by wish of the national government, to procure means for a program with which to fight unemployment, through distribution of contracts to German industry. Because of this need the government has refused the railroads an old claim that amounted to 130,000,000 marks.

This difficult financial situation left available only the most urgently required means for maintenance and renewal, and improvements as well as new construction could be undertaken only in a very limited manner. Among new construction, the completion of the new passenger station for the border and customs traffic in Neu-Bentschen, and the beginning of the new double-track railroad bridge over the Rhine at Mannheim-Ludwigshafen must be mentioned.

The State Railways are very much interested in experiments which a company for traffic technic (Gesellschaft für Verkehrstechnik) has undertaken with a new propeller driven car. Traveling on rails and driven by a propeller, this car can carry about 50 passengers, and has developed a speed of 182 kilometers (117 miles) per hour on an experimental stretch of 8 kilometers.

REICHSBAHNRAT DR. GENEST.

Spain

Under the "community regime" between the railroad companies and the Spanish government, established pursuant to a law approved by a royal decree of July 12, 1924, a large part of the liabilities then existing have since been liquidated by the present government, without failure to meet other obligations assumed by the dictatorship in the name of the state. More than 3,000 improvement and expansion projects under way in 1930; 28 new railroads subsidized and under construction, and purchases of material, definitely authorized and even carried into effect, combined to produce an exceptional capital expenditure of 391,000,000 pesetas ($75,463,000), as compared with investments of 126,000,000 pesetas in 1929. Some of the new work in progress during the year was suspended, despite fear of an acute employment crisis, but only such restrictive measures were taken as were made necessary by the suppression of the state railroad appropriation and by the elimination of the special railway debt. One result of these circumstances, however, has been an almost complete cessation of new equipment buying.

In addition to the elimination of appropriations for the railroads by the state, a substantial decrease in both freight and passenger traffic, due in large part to highway competition, has reduced income to a point well below that for the same period in 1929—a condition to which the Northern Railway is the only important exception. Revenue statistics covering 10 months of 1930, show, for the four principal Spanish railways, the following results:

Railway	Revenue, 1930 (10 months)—pesetas		Comparison with 1929 (10 months) —pesetas	
Northern	294,000,000	($56,742,000)	inc.	9,000,000
Madrid, Zaragoza & Alicante	255,000,000	($49,215,000)	dec.	1,198,476
National of Western Spain*	97,000,000	($18,721,000)	dec.	2,221,774
Andalusian	60,000,000	($11,580,000)	dec.	148,238

* The National of Western Spain is a new company recently formed by the consolidation of a number of small roads.

In the case of the Northern, the increase in revenue was largely nullified by a corresponding increase in operating expenses.

In view of the economic conditions mentioned above, the present status of the Spanish railways may well be described as critical. With only part of the regime law of 1924 in actual operation; and with significant improvements and additions to equipment and facilities, both present and contemplated, curtailed, it is only natural that the companies should consider present working conditions unsatisfactory, and be somewhat pessimistic about the immediate future as well. Transportation legislation by the next Cortes (Congress), to amend or replace the community regime law, has been suggested as one solution of existing problems, but the questions to be dealt with in such a law, or the form of the law itself, are still uncertain. Much more effective, however, would seem to be the suggestion that the Spanish railways abandon their present policy of single-handed isolation, and seek active co-operation with foreign railways, industries, and other transport organizations—such as the Spanish League of Owners of Private Cars, the Associations of Auto Truck Owners and the Railway Agents—with the purpose of guaranteeing themselves an adequate and organized supply of traffic.

VICENTE MZ. DE LECEA.

U. S. S. R.

Railway operations in the Soviet Union for 1929-1930 —the second year of the revised Five-Year Plan for the industrial development of Russia—are described as follows in an article published by the Amtorg Trading Corporation, official American representatives of the Soviets: "The revised plan for freight operations in 1929-1930 set the freight turnover at 240,000,000 tons, as against 212,000,000 tons estimated in the Five-Year Plan. The returns for the year showed that 234,000,000 tons of freight were handled, an increase of 33.8 per cent over 1928-1929." This traffic involved the production of 138,000,000,000 ton-kilometers (85,698,000,000 ton-miles), exceeding by more than 100 per cent the ton-kilometers produced in 1913. A total of 510,200,000 passengers were carried, an increase of 50 per cent over 1928-1929.

The Amtorg article goes on to say, however, that "the number of locomotives in disrepair increased. Rolling stock was not utilized to the best advantage, due in part to poor organization, both of the industries served by the railways and of the railways themselves. Whereas the daily run of freight cars was set at 109 kilometers (67.7 miles) in the plan, the actual average run was only 95.3 kilometers, as against 89.7 kilometers in 1928-1929. The daily run of freight locomotives (156 kilometers) was under last year's average. The average speed of freight trains, set at 14.7 kilometers per hour in the program, amounted to 13 kilometers—0.8 kilometers less than in 1928-1929.

"The plan of new construction for the year was not realized in full. Capital construction on existing and new railways amounted to about 74 per cent of the program, due mainly to inadequate supplies of steel and materials, and to the fact that thousands of skilled workers left their jobs to work in better paid industries. The cost of capital construction amounted to 679,000,000 rubles ($350,000,000), as compared with 415,000,000 rubles in 1928-1929. * * * The outstanding example of new construction is the Túrkestan-Siberian Railway, completed in May, 1930. This extends for 1,445 kilometers (897 miles) through Siberia and central Asia, and was built at a cost of $100,000,000. During the fiscal year 1929-1930 work was started on 11 new lines and the total length of railways under construction was 11,039 kilometers (6,855 miles), more than double the 1928-1929 figure. * * *"

In regard to administrative developments, the article says: "New regulations concerning railway management, recently drawn up, provide that the entire control

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ALCO BUILT

To-morrow's Profits

THE automobile of 1910, like the coach-and-four of an earlier day, is now largely a subject for the funny papers. The automobile of 1920, although it may still be able to wheeze along, is practically valueless. Why?

The name of Andrew Carnegie is now almost a synonym for thriftiness. And yet Carnegie at the height of his career was known as the world's greatest spender—a man who would not hesitate to scrap a busy steel mill that had cost millions. Why?

The automobile makers realized almost from the beginning that, no matter how fast engineering developments may come, it is true economy to keep pace with them. Andrew Carnegie's thriftiness was the canny kind. Every time he tore down a million-dollar unit, he built another that many times multiplied his former net yield.

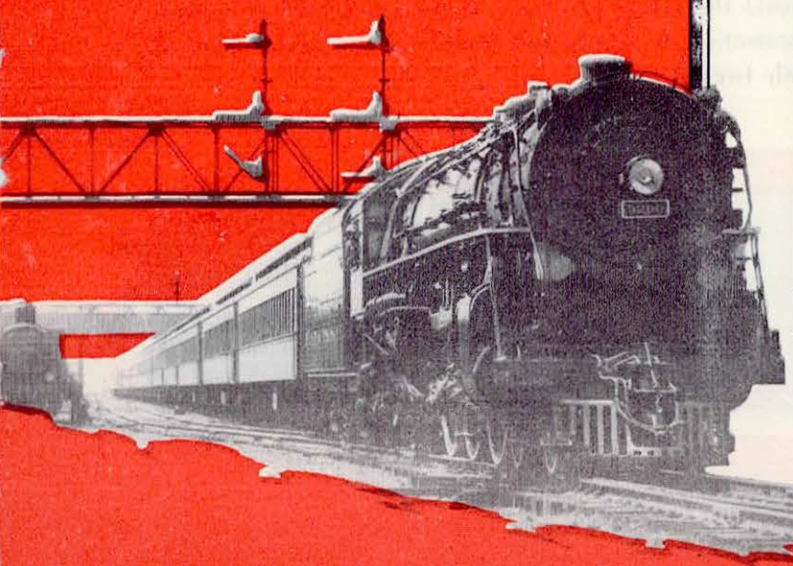
But what about the railroads? How explain the fact that on the Class I roads of the United States nearly half of the steam locomotives were built prior to 1910, and that still another thirty per cent were built before 1920? How explain that only about twenty per cent of the locomotives now running are, in any modern sense, efficient? Is that thrift? Is that canniness? Is that economy?

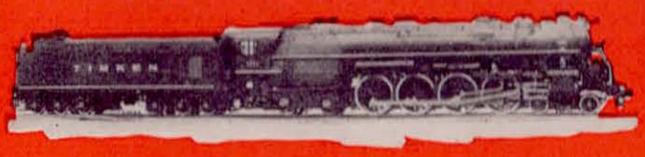
The antiquated factory, although still capable of production cannot compete with the modernly equipped plant. The steam locomotive is the fundamental producing unit of our railroads. Antiquated locomotives may not run behind schedule—but just a little study of an annual report will show how they run behind when it comes to figuring earnings.

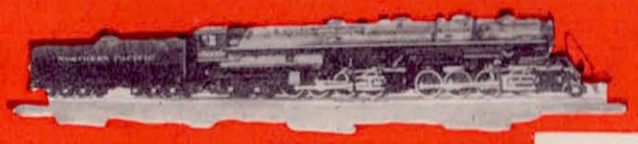
To railroad men who are informed—to those who squarely face the facts about the increased efficiency of modern locomotives—it must be apparent that the scrapping process is far from being extravagant. Like Carnegie, and like the great industrialists of today, they must see that the truly far-sighted policy is that of sacrificing immediate gains to invest in increased future earnings and competitive advantage.

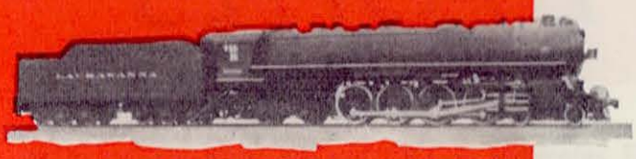
American railroads of today can profit from Carnegie's lesson of yesterday.

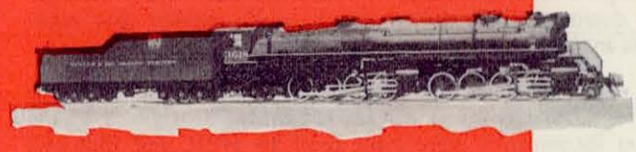
Tomorrow's dividends can only be earned by today's efficiency.

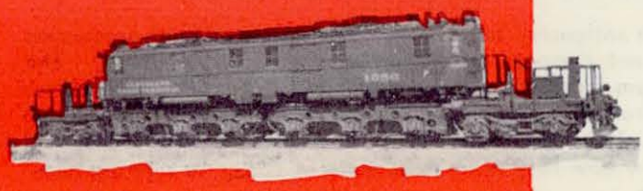












AL BUI

THE modern locomotive is not an experiment.

It is a tried machine.

Its immense advantages over locomotives of only five to ten years ago have been demonstrated. It has been shown to be much more efficient in the use of fuel, capable of high sustained horsepower, reliable in operation, reasonably low in maintenance costs and available for continuous service over long periods of time.

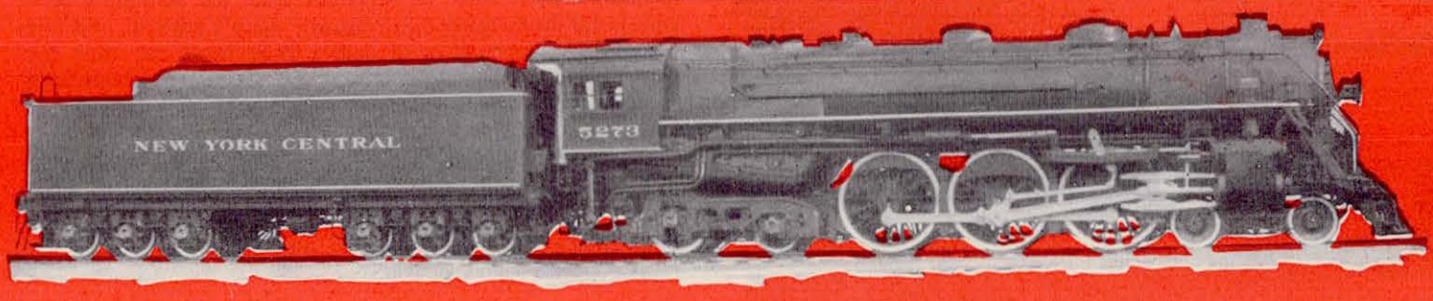
This product of an era of efficiency has played no small part in the economies effected by our railroads during the past few years.

How? Consider the fuel bill.

American railways in 1929 paid $365,000,000 for twenty-three per cent of the bituminous coal output of the nation. This bill might have been millions of dollars more but for the fuel efficiency of the modern locomotive.

Average fuel consumption in freight service per 1,000 gross ton miles for the first six months of 1930 was 125 pounds, as compared with 173 pounds in 1920—a decrease of more than twenty-seven per cent.

These savings were largely due to improved operating methods, the use of modern locomotives, and the application of fuel-saving devices to such locomotives in service as were of recent enough design to warrant their use. What would the saving have been if the percentage of modern locomotives in service had been fifty per cent instead of only twenty.



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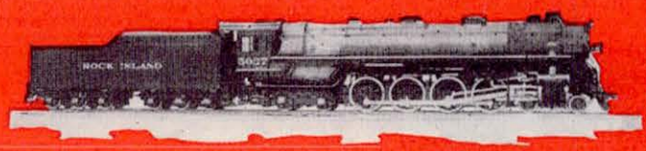
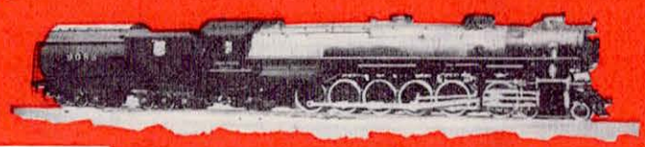
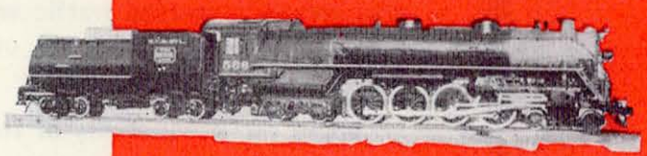




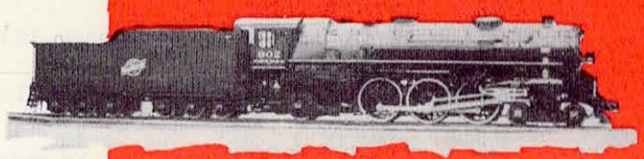
AND what of power? How does the modern locomotive affect the amount and kind of work that can be done per unit of cost?

Introduction of new units has raised the tractive power of all locomotives in service by about nineteen per cent since 1923. But this, in itself, does not tell the whole story. The term tractive power does not fully indicate the proper measure of power of a locomotive. Tractive power simply indicates the maximum power at starting.

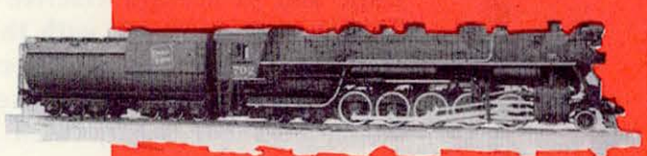


Modern efficiency is measured in time as well as power.

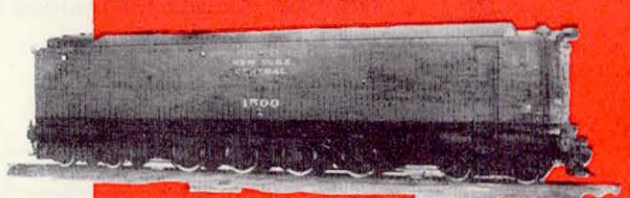
The measure of capacity to move freight is no longer considered the maximum train that can be started, but rather the maximum amount of freight that can be moved in the minimum time, usually expressed as gross ton miles per train hour. Therefore, locomotive capacity should be in similar terms.



To the railroad executive, the horsepower capacity for a given locomotive is more important than the tractive effort. For, while two different locomotives may have the same maximum tractive power, one may be able to haul fifty per cent more than the other at the prevailing operating speed.



Here is just one case in point. A large eastern road purchased some modern heavy freight locomotives. They were put into service with locomotives built about twelve years previously. Both the new and the old had the same theoretical tractive force and about the same wheel loading. After a fair and reasonable test the modern locomotives demonstrated their ability to increase train loads by seventeen per cent and speed between terminals by thirty-four per cent and, equally important, they consumed thirty-two per cent less fuel per 1,000 gross ton miles.



The old locomotives are still in use, probably capable of many more years of service—but it is the new locomotives which are contributing to tomorrow's profits.

ALCO
BUILT

THIS year, 1930, has been a hard boiled year. The spoils of competition have gone to those who effected the greatest economies and the highest productivity.

The banner year, 1929, showed the possibilities of economy. The freight traffic handled in that year was the largest on record, an increase of twenty-five per cent over 1920. Yet this greatly increased traffic was handled with a consumption of coal 9,000,000 tons, or ten per cent, less than in 1920.

Compare the productivity of freight traffic:

	1920	1929
Average tons per train	1,442	1,866
Average Speed	10.3 miles per hour	13.2
Gross ton miles per train hour	14,877	24,553
Average tractive power of Freight Locomotives	41,443 pounds	50,066

Thus in 1929 there was an increase in train load of twenty-nine per cent, in speed of twenty-seven per cent, but the increase in gross ton miles per train hour was sixty-five per cent, and in average tractive power only 20.8 per cent. This was accomplished with three per cent less train miles and twenty-four per cent less train hours. During this period, the amount of fuel used per 1,000 gross ton miles decreased about twenty-seven per cent.

Such economies are available through use of the locomotive of today.

The road is clear for railroad managers to insure the profits of tomorrow.

AMERICAN LOCOMOTIVE COMPANY
30 CHURCH ST., NEW YORK CITY

and management of a road be vested in a director who works according to the program laid down by the Commissariat for Transportation. Many operating and administrative details formerly under the direct control of the Commissariat are now decentralized and handed over to the respective railways. The extent of railway construction, the number of workers and technical employees, wages, productivity, cost estimates, the program of capital investments and building, the necessary financing, etc., are specified in the program. While the new regulations give the director the right to make a certain number of changes, this does not apply to a fundamental revision of the program."

That the Soviet railways are going ahead with their ambitious program, despite failure to reach all their 1929-1930 objectives, is shown by the facts that the freight program for 1930-1931 has been set 50 per cent ahead of last year's results; that passenger operations are estimated at double the 1928-1929 figure; and that 1,000 new locomotives and over 50,000 new cars of all types are to go into service within the year. A general reorganization is to be carried out, "to a considerable extent on the basis of American experience."

Poland

In analyzing the condition of the Polish State Railways in 1930 it is necessary to remember that Poland was also affected by the economic crisis of the world and therefore the railways, the State's largest enterprise, had to cope with the results of this crisis. The next problem of importance which the railroad had to consider was the matter of highway competition. The ever-increasing use of automobiles has during recent years deprived the railroads of much income. The arrangement of proper collaboration between these two means of transportation will have to be solved by the government in the near future. First, however, regulation of highway transport, which is not yet provided for in the Polish laws, will have to be settled. The government proposes to establish a system of licenses and to put a tax on operators for the upkeep of highways, a measure which has not so far been applied. It is noteworthy that the interested ministries have no intention of monopolizing motor vehicle services; they will collaborate with private enterprises reserving to themselves the right of supervision and control of the relations between the railroads and the highways.

Considering the economic situation of the Polish State Railways in 1930 one must point out that in spite of the economic crisis, and therefore of a decrease of traffic and income; in spite also of the automobile competition, the Polish railways kept within their budget and spent large sums from income on capital improvements. The building of a main coal line connecting directly the Polish Silesian coal mines with Gdynia, the ever developing Polish seaport on the Baltic, is by far the largest project. The purpose of this line is to give Poland the greatest facility for the exportation of coal to oversea markets. Of the 280 miles of this line two-thirds, or 190 miles, are in operation already, having involved an expenditure of $13,500,000. This line is located entirely within Polish territory and thus the only Polish seaport, Gdynia, has now its own main railroad line, a matter of utmost importance to the economic life of the country. The building of this line was the most important investment of the Polish railroads since Poland became independent.

In view of certain rumours in the foreign press concerning the selling or leasing of this line to a foreign corporation, the Ministry of Communication states that it is interested in foreign capital being invested in the Polish railways, on conditions, however, guaranteeing the interests of both parties. This explains why steps are being taken to transform the Ministry into a separate corporation which could handle independently financial transactions. The first move in this direction has already been made; the Ministry has evaluated its property at close to one billion dollars, and thereby established a basis for mortgages. Moreover the Ministry has arrived at an understanding with the interested bodies concerning projected regulations by which the Polish railways could become an independent corporation. These regulations will be issued in the nearest future and will be a matter of great importance to foreign capitalists.

Speaking of investments one must mention the reconstruction of the Warsaw main station and track system, which will increase the efficiency of the traffic from and to Poland's capital city, create a most modern central station in that city, establish a main line running under the principal streets, and a modern switching yard. This work is nearing completion; the building of the central station will be started next year in order that it may be open to traffic within three years.

An important development took place in the realm of finances, or rather of rolling stock building, namely the Lilpop Corporation of Warsaw, one of the largest Polish companies building equipment obtained in the United States a credit of $40,000,000, which will considerably increase the production of this company. It will supply 14,000 freight cars to the Polish railways during the next few years.

The Polish railways have recently been paying special attention to the tourist movement in Poland, by establishing convenient travel routes for automobiles and the railroad; also on several main line trains radios have been installed for the passengers, the charge for use being 15 cents per journey.

In closing a few words must be added about the cultural-educational work of the Ministry among its employees. It has established 639 institutions for the general moral and intellectual development of the railroad men and their families. It has also helped to organize an association of the railroad men, whose 40,000 members take part in sports and physical education.

DR. WACLAW ZAWISZA.

Czechoslovakia

Summarizing the situation of the state railways in the National Assembly last May, the Minister of Railways stressed the constant rise in earnings, which, in 1928, were 4,511,000,000 crowns ($134,750,150), or 14 per cent higher than in 1927, and pointed out particularly the favorable decline of the operating ratio from 95 in 1925 to 87.37 in 1928. Discussion of the situation in the same legislative body at the end of 1930 appears less hopeful. Under the pressure of the economic slump and of highway competition it is expected that net operating revenue will decline and it was necessary to raise passenger rates by 20 per cent as of January 1, 1931. By the end of August, 1930, earnings were 628,000,000 crowns less than the budget estimate, and an operating loss of about 500,000,000 crowns ($14,825,000) is anticipated by the end of the year.

Proper consideration of the financial situation, however, will only be possible when the definite valuation of the railways shall have been completed. The Hague Convention removed the last obstacle to the publishing of such valuation, by reaching a definite settlement concerning property taken over under the peace treaty. It may be pointed out that the present figure for depreciation and maintenance of the system (255,000,000 Czecho-

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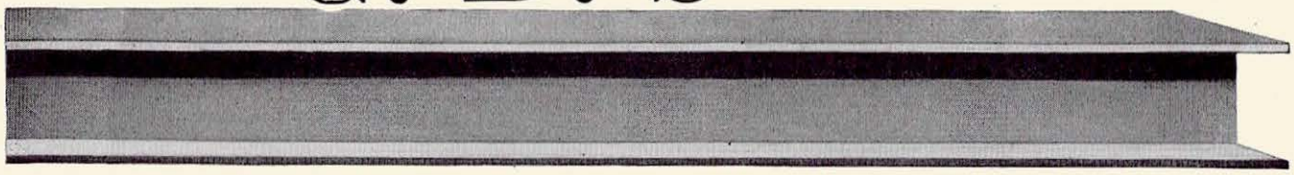

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slovakian crowns, or $7,560,750) is rather too low, since the value of the system is estimated as about three times as high as the corresponding amount on the basis of 10 per cent for depreciation and maintenance. This appears to be a further development which threatens the financial stability of the system. In view of the expected fall in the net revenue, the investment, or capital allowance for 1931, has been reduced by about 100,000,000 crowns, this allowance for 1930 being about 485,000,000 crowns ($14,380,250).

Technically, the railways show slow but steady progress, corresponding to prevailing economic conditions. Labor-saving appliances of all kinds have been introduced with very satisfactory results. A total of 107 new locomotives, 25 tenders and 66 rail-motor cars were bought, while the average ton-kilometer performance per locomotive was 6.3 per cent higher and the coal consumption per ton-kilometer 12.5 per cent lower than in 1912. For the introduction of Bozic brakes more than 81,000,000 crowns were spent in 1930, the total expenditure for this improvement being put at 300,000,000 crowns. Intense interest has also been shown in introduction of safety appliances of all kinds. In 1930 the system had about 12,000 passenger and 110,000 freight cars, but few special cars. The railway administration also operated 46 motor coaches. Some progress was made in building second track on main lines of international importance and in strengthening bridges to permit safe operation of new heavy locomotives with axle-loads of 17 tons. In the important Prague terminal question, however, only small progress was made. The construction of the new Handlova-Horni Stubna line was continued in four sections, the most interesting being the three-kilometer (1.86-mile) Pod Bradlem tunnel. Construction of another new line from Cervená Skála to Margecany (58 miles) was also started.

In the first half of 1930 about 131,000,000 passengers, an increase of three per cent, and 32,500,000 tons of freight, a decrease of 12 per cent, were carried; in the latter decline both local and international freight participated.

From these facts it is evident that the question of economic stability of the Czechoslovakian railway system has not been settled definitely, and that further measures of a very decisive nature are necessary to define the position and role of railways in the Czechoslovakian national economy. DR. V. PARTL.

Sweden

Railways of Sweden during 1930 experienced a marked decline in traffic as compared with 1929. The world-wide industrial depression, however, has as yet affected Sweden far less than most other countries. The decline of railway traffic, therefore, although rather noteworthy, has not been so far-reaching as it was, for instance, in the United States.

During the first eight months of 1930 as compared with 1929, freight traffic on the state railways decreased five per cent and on private railways seven per cent; freight revenues fell six and nine per cent respectively. Passenger revenue on state railways, on the other hand, increased nine per cent and on private railways remained unchanged. The increase may to some extent be due to the Stockholm exhibition this year, but there were other factors. Passenger traffic has for many years shown a steady increase and this, no doubt, is a result of the very moderate fares. For instance, the ordinary fare for a third class trip over 600 kilometers (374 miles) is 23 kronor ($6.13), or at a rate of only 1.64 cents per mile (second and first class respectively, 50 and 200 per cent more).

New standard freight rates became effective October 1, and are expected to produce a decline in freight revenues of about eight or ten per cent. In anticipation of these adjustments some temporary reductions were introduced effective February 1 and these latter to some extent effected the above-mentioned fall in freight receipts. In the coming year freight rate reductions will bring a substantial decline in railway revenues, if general business conditions do not improve to increase traffic volume. The new standard rates are the lowest on the state railways and on some few of the financially strong private lines, while considerably higher rates are in effect for most of the latter.

The state system is the most important in Sweden and comprises most of the main lines. In 1929 it reached a record net income of 49.3 million kronor ($13,200,000), equivalent to 4.47 per cent on the costs of construction. This sum was more than sufficient to cover the interest charges to the State in connection with advances of capital. In 1930, a net income of between 40 and 45 million kronor is anticipated while in 1931, as stated above, the income probably will be still lower.

Returns of private railways vary considerably; some make good profits, while others suffer from very great financial difficulties. The decline in 1930 traffic has affected these more than it has the state railways and a great many of them will probably show a deficit. Furthermore, all private railways are encountering labor difficulties; their employes are seeking new working agreements to become effective January 1. Salary questions are also pending on the government railways. It is impossible as yet to predict the outcome of these negotiations. In view of the existing economic situation, and prospects for the future, most of the railways are absolutely incapable of meeting any increased wage scales.

The more important new facilities projected during the past year are not yet in service. Following upon the success of the Stockholm-Gothenborg electrification, another important electrification project is being considered (Stockholm-Malmo, etc., 856 kilometers), and the work is likely to be commenced during 1931.

DR. LARS AKSELSSON.

Denmark

Economic conditions on the Danish State Railways have become less satisfactory during the past year, operations resulting in a small deficit, as a result of which nothing could be laid aside for amortization or interest on capital. Traffic as well as gross receipts have, to be sure, increased, but expenditures have risen still more, partly because an unusual amount of maintenance work was necessary after the severe winter of 1929, and partly because the price of coal has risen.

Competition with highway traffic is very severe. Denmark now has one motor vehicle per 27 inhabitants, and motor traffic is favored by the nation's short distances, by its splendid road system, and by strong popular preference. The State Railways have entered a period of intense activity in order to hold and gain traffic. This is done through special freight agents, and also through innovations in traffic and tariff conditions, such as more frequent and faster train service, freight transportation from all stations to receivers, and special excursions to natural beauty spots, at reduced rates—in other words by better service.

The railways are steadily acquiring new rolling stock, including special motor cars of increasingly large size—the latest of which have Diesel locomotives of 900 h.p. with a speed of 100 kilometers (62.1 miles) per hour—and new passenger cars with upholstered seats for Co-

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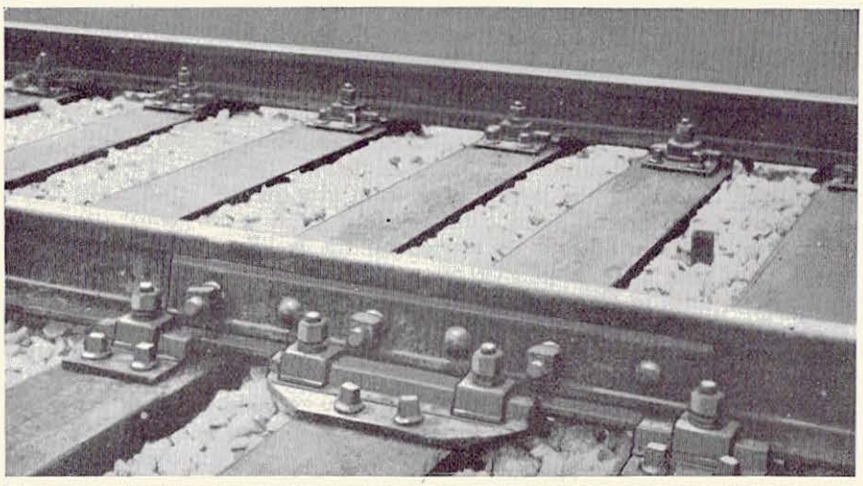
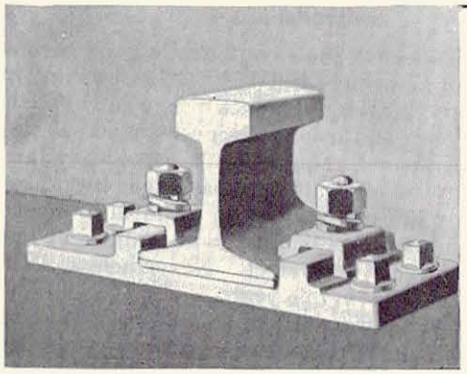
A test section of GEO track will convince you of its

OUTSTANDING SUPERIORITY





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TRACK CONSTRUCTION

penhagen's suburban traffic, which will be standardized to one class only.

For ferry transportation, several new ferries with Diesel drive are being built, and the first automobile ferry has recently been delivered, specially constructed with a capacity of 50 cars per trip, for use on a main ferry route 26 kilometers long. All ferries are now equipped with radios.

Construction of new railway lines has now practically stopped, but the work of electrifying Copenhagen's suburban lines has been begun. The work of double tracking and of rebuilding the larger stations in accordance with modern standards is being continued.

Experimental work has been started on the welding of 15-meter rails to form long 30-meter (98.4-ft.) rails on the main lines in Copenhagen. The construction of a large railroad bridge over Alssund has been finished, and the construction of a highway bridge over Lillebaelt, which will cost about $10,000,000, and is extremely large, according to Danish standards, is being continued.

E. TERKELSEN.

Norway

Traffic and revenues of the Norwegian State Railways declined substantially for the year ending June 30, 1930, as compared with the previous year. This decline was accompanied by an increase in expenses and the two factors produced a deficit for the year amounting to 1,600,000 kroner ($428,000) as compared with a net revenue of 1,000,000 kroner ($268,000) for the year ending June 30, 1929. The traffic decline was confined to the freight business while the passenger traffic which in recent years has been declining increased slightly; it is questionable, however, whether the upturn in the latter will continue. Privately-owned railways of Norway are not particularly important transportations systems since they serve only local areas. The traffic and revenues of these lines were about the same for the year ending June 30, 1930, as in the previous year. Generally speaking, however, these private railways are encountering financial difficulties attending the loss of traffic to competitive highway carriers.

O. HOLTMON.

Netherlands

Although net operating revenues of the Netherlands railway system increased steadily from 1923 to 1929, reaching in the latter year a record of 50,614,503 florins ($20,347,030), equivalent to 13,661 florins ($5,492) per kilometer of line, the year 1930 produced a decrease in those figures. Sustained depression in practically every line of industry and trade had an unfavorable effect on traffic and earnings in Holland, as elsewhere in Europe. In addition, the continuous advance in tariffs of the different European countries, as well as in those of the United States, reduced exports of Dutch products. Agriculture, especially, suffered severely as a result of these circumstances. Consequently, it is evident that total car loadings for 1930 will show a considerable decrease from the figures reached in 1929. Continued growth of highway traffic also affected the Dutch railroads adversely.

Nevertheless, in spite of these disturbing influences, traffic as a whole continued to increase, for the number of passengers using the railways is still growing, even in the face of a steady increase in the number of private automobiles and in motor coach services. To combat this heavy competition, improvements on rail transportation have been put into effect. The electrification of the Amsterdam-Rotterdam and Haarlem-Ijmuiden lines some years ago proved entirely successful, especially on the latter line where motor competition has nearly disappeared. It was this success which determined the further electrification of the Amsterdam-Alkmaar and Uitgeest-Velsen lines. Electric traction on these lines will be inaugurated in May, 1931; and, as on the Amsterdam-Rotterdam line, traffic will be handled by multiple unit cars, working on direct current at 1,500 volts. On secondary lines, where traffic is less dense, motor competition has been met by gasoline rail motor cars.

To combat highway competition in short-haul freight traffic, the Dutch railways have established co-ordinated motor truck collection and delivery, to give door-to-door service, and have introduced containers for the use of shippers. For long-haul freight traffic, a number of heavy four-coupled locomotives were procured in 1930, while the Kunze-Knor automatic freight brake has been adopted, as in Germany. These improvements will make it possible to speed up main trackers and freight car movement.

On the whole, while 1930 will be a relatively poor year, the Dutch railways, by reason of improvements in operation and management, are looking forward to a better return for 1931.

ING. W. SIMON-THOMAS.

Switzerland

As was to be expected, the exceptionally good results of 1929 could not be achieved in 1930. This was due in part to reductions in freight rates which went into effect during the year, and in part to increases in salaries of the railway personnel, required by a new salary law. Moreover, a rainy summer affected passenger traffic adversely, especially in July, and had a harmful influence on the tourist industry on which Switzerland and her railways are so largely dependent. Nevertheless, 1930 must be considered a favorable year.

Electrification still forms one of the major phases of the work of the State Railways. The enormous grades on the system, as well as the relatively easy utilization of water power, make it easy to understand that Switzerland not only relatively, but actually, boasts of more progress in railroad electrification than any other country in Europe. The length of electrified trackage is 1,666 kilometers (1,035 miles). A program has, moreover, been laid out through which, between 1930 and 1936, at a total cost of 81,000,000 francs ($15,633,000), 476 more kilometers will be electrified. After completion of this second construction program, 2,142 kilometers, or 57.8 per cent of the total of 3,703 kilometers of standard gage lines will be electrified, and of the total of 5,485 kilometers (3,406 miles) comprising the entire system of all gages, 4,834 kilometers, or 88.1 per cent, will be electrified.

In 1930 private lines also went over from steam to electric power, and, in part, drew their power from the State Railways. Other private lines are at present investigating these problems. Soon the four existing power plants will be utilized to full capacity and steps are now being taken toward the construction of a large power plant at Etzel. In contrast to the construction of earlier power plants, undertaken entirely by the State Railways construction and operation of this one will be in the hands of a stock company, in which the State Railways own a 55 per cent interest.

For the improvement of express service on the Gothard line, the State Railways have ordered two heavy double locomotives of 7,200 and 6,640 hp., the former equipped with 16 and the latter with 8 motors. A

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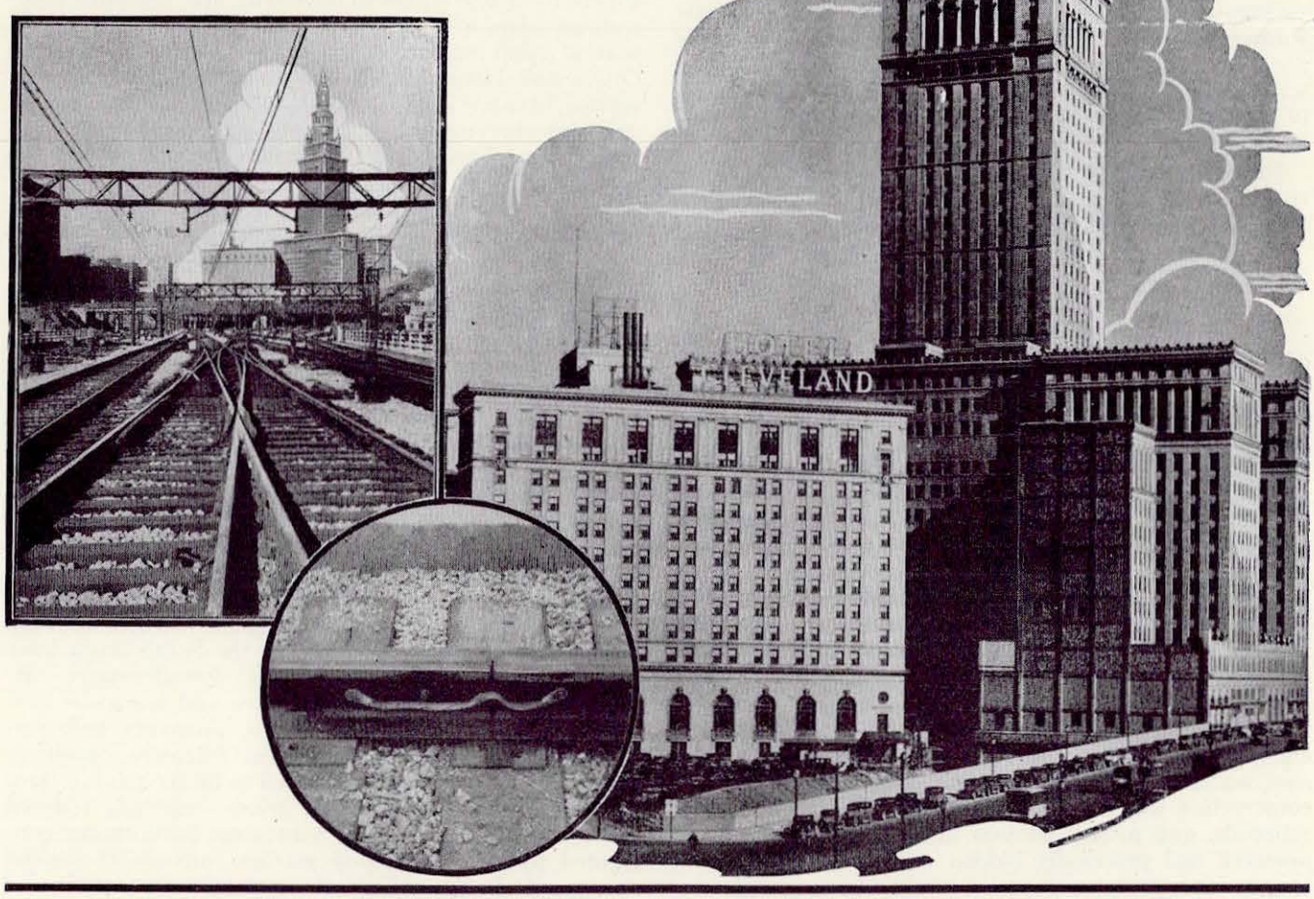

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number of new eight-wheel steel passenger cars have been purchased. The Drolshammer freight brake is being introduced, and equipment of all freight cars with these brakes should be completed by the end of 1935, effecting a saving in train personnel of 400 men.

An historical event that took place during the year was the fiftieth anniversary of the opening of the 15-kilometer Gothard tunnel, which was finished on February 28, 1880. This anniversary celebration coincided with the twenty-fifth anniversary of the Simplon tunnel.

The "Swiss Express Company," founded some years ago, and having as its main purpose improvement and reduction in prices of trucking service, has a favorable influence on the railroads. It closed contracts with the earlier truck operators, prescribing conditions and rates. The number of these operators, all of them private in character, is steadily increasing. At all stations where such agencies exist direct delivery to and from homes is possible, just as with direct automobile transport.

The State Railways are steadily paying more attention to accident prevention. The accident prevention service which was formed some time ago attempts to educate employees in the many dangers of railroad work, which have been increased by electrification. A savings bank for the personnel, operated by the State Railways, is enjoying increasing patronage. Payments are made comparatively easy and the railways pay a somewhat higher interest rate than other savings institutions. Milk stations for the personnel form another branch of welfare work.

In general, it can be said that in the past year progress has again been made, and that the prospects for the State Railways have again been improved.

T. GOETTLER.

Peru

The outlook for the Peruvian railways at the beginning of 1930 was exceedingly bright. All traffic during 1929 had been consistently on the up-grade, and gave every promise of making records during the coming year. The contract signed in November, 1928, handing the Peruvian railways over to the Peruvian Corporation for perpetuity, was then commencing to show its beneficial effects on revenues and net income. Reorganized administration—a perilous course to pursue in this country—was reaching expectations; a much more conciliatory policy towards the traveling public and shippers was being fostered; all services were being speeded up, and, in a word, the railways were being modernized as far as conditions would permit.

Construction, both of highways and railways, was going slowly but surely ahead—slow because of the inherent difficulties and the enormous expense involved, and sure because of their undoubted economic value. This construction was the vein of supply to the main arterial railroads, and mostly all was designed to tap the vast potential and practically hidden wealth of Peru. Rich, but, so far as known, small mines of base and rare metals, coal fields (with their untold possibilities from the distillation of by-products), unlimited tracts of valuably wooded lands, prospective oil fields, etc., solely depend for their unquestionable remunerative development on relatively cheap and efficient transportation. The slump in market prices of Peruvian coastal products, chiefly sugar and cotton, could only tend to drive expansion into the interior, and Peruvian railways are fortunate in that their main revenues are derived from long distance transports to and from the coast. Consequently prospects for the railways were decidedly encouraging.

The competition of the automobile for passenger and freight traffic on the short-haul and suburban routes of the coastal sections was increasing as was only to be expected. The Central Railway planned to meet this competition by the establishment of motor collection and delivery services, and where practicable, reductions in rates and added facilities for passengers. For the most part, road competition in Peru, if not unfair, is at least unreasonable. Small capitalists rush into the truck and bus business and perforce follow the cut throat policy of freights at any price; depreciation, replacements, interest on capital, etc., are to them but niceties and do not enter into their calculations, and the results to all concerned are disastrous.

The Central Railway motor service at the time of writing is in the embryo stage, but its future seems to be guaranteed by the fact that it fills a long felt want in supplying an economical and rapid transport connecting link between the producing centers and ports, the railway and the markets.

Passenger road transport is somewhat outside the sphere of the railways. All competitive highway routes are of comparatively short distance. Population along these routes is scattered, and many stops have to be made. Roads are mostly direct to the towns, and combined road- and rail fares are at present impracticable. During the year a steam rail car was placed in operation between Oroya and Huancayo, giving an intermediate and fast service between these mining and agricultural centers, and also checking the inroads of motor competition on this section. Favored by low grades, the unit to date has entirely filled its purpose.

Many innovations were planned for at the beginning of 1930 to handle the then apparently assured increasing traffic. Rolling stock on all lines was scheduled for many improvements, dining cars were to be added to all long distance passenger trains, and these trains were also considerably speeded up. Modern systems of signaling and telephonic communication for train operation were studied and projected. Two double articulated locomotives of the Beyer-Garratt type were on order for the Central Railway and extensive alterations were made to the tracks for their accommodation. These locomotives were received and placed in operation during September last, and results to date have proved them to be eminently suited to the heavy mountain grades—ruling over four per cent—and their extended use is contemplated.

The coming storm cast its shadow towards the mid-year. World-wide depression, stagnant markets and fast falling prices vitally hit Peru. In the South crops were left unharvested, or harvested and stored—sugar, cotton, wool and other staple exports would not cover bare transportation costs. Small mines, prospects and construction automatically closed down. Intensive concentration of ores—of necessity resorted to by the mining companies, to meet lowered metal prices—naturally reduced tonnages to be moved. The Vanadium Corporation, confronted by an overstocked market, entirely suspended operations. Large and small companies were all forced to retrench; railway revenues immediately reflected the ruling conditions.

Peru was in a precarious position. Heavy loans had been spent and misspent to develop the country's resources—none of which could bear any immediate fruit. The exchange fell rapidly, and is still falling. A revolt of the troops in the South hastened the fall of the government. The bolstered-up condition of the country was laid bare, and of course exaggerated. Peruvian labor seized what it considered to be a glorious opportunity.

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STRONG FASTENINGS FOR SAFE TRACKS

TREMENDOUS stresses, mighty shocks, powerful pressures and thrusts —this is the lot of the track structure under modern traffic conditions. In the face of this, track alignment and rigidity must be maintained and here, as every railroad man knows, the spikes, bolts, tie plates and splices play a vital part.

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TENNESSEE

Strikes during the initial period of the new regime became contagious and rampant. Demands were made by the workers for impossible concessions and privileges. There is yet much unrest as many factions are involved in the upheaval.

Immediate prospects are problematical. It is certain that Peru has an assured future—a future in which the railways must take an integral part. The question is if that future is to be retarded by internal troubles, diminishing foreign confidence and the unreasonable demands of labor. A stable democratic government will go far to solve the question, and only time can show when such a government has been obtained.

In conclusion, it may be said that the year has been one of distinct progress for the railways in the matter of improved organization and equipment, offset—temporarily it is to be hoped—by the reaction in Peru of world-wide depression, political and labor unrest.

GEOFFREY W. MORKILL.

Argentina

Following several highly successful years, the Argentine railways suffered a setback in 1930. Coincident with the general depression in the grain market, a large part of the 1929-30 harvest was lost through unfavorable weather conditions and the situation was further complicated by a fall in the exchange value of the peso.

Depending largely on her exports of cereals to maintain a favorable balance of trade, Argentina was particularly affected by the low prices prevailing throughout 1929, and after the break in the New York stock market the government, in order to protect its reserves, decided to suspend the redemption of paper money in gold. The resulting decline of an already weakened exchange to about 18 per cent below par has been especially felt by the lines under British ownership, which comprise two-thirds of the total mileage of the country and handle four-fifths of the traffic.

Receipts began to weaken towards the end of 1929 and fell off still further in 1930 as a result of the crop failure and the slow movement of grain consequent on lack of demand. While operating economies were effected, the decrease in net revenue was considerable, and the dividends declared by the British companies for the fiscal year ending June 30 were, with a single exception, one or two per cent less than for the preceding twelve months. At the time of writing there is little change for the better, though some of the smaller lines are showing increased receipts over 1929. The noticeable improvement in the State Railways is attributable to the reforms instituted by the Provisional Government following the coup d'état of September 6.

As regards the outlook for 1930, the prospects of a good harvest are reported to be excellent, but a return to normal prosperity is not to be expected until there is a healthier demand for grain. Argentina has known lean years before, however, and if we may judge by history her recovery will be rapid and complete.

Labor conditions are unsatisfactory. Notwithstanding the unpropitious circumstances the Union of Railway Employees declared strikes in November, 1929, and March, 1930, demanding a readjustment of wages and other privileges. The latter movement was accompanied by a considerable amount of violence on the part of the public and was only brought to an end by a decree of the President. A joint fact finding committee was established under the chairmanship of the Director General of Railways, whose report has not yet been issued. The strikes referred to took the form of stopping all traffic for an hour one day, two hours the next, and so on, or else of an exaggeratedly strict observance of the regulations known as "working to rules." Some amusing incidents occurred, as when a train was held up in a station while the agent, one of whose functions is to give the signal for departure, rushed about looking for his cap which had presumably been hidden away by the strikers, the rules requiring that employees wear full uniform while on duty.

The question of rates is being brought to the fore in connection with the agricultural depression, the latest news being that the Minister of Agriculture has approved the report of a special committee recommending reductions and has requested the Minister of Public Works to take up the matter with the railways. Generally speaking, rates have been left more or less at the level to which they were raised after the war, except that in 1928 the government took the unusual course of decreeing reductions which affected one company only. The official attitude toward capital invested in railways, however, has on the whole been very fair, and there is no reason to doubt that this policy will be adhered to in the future, as it is generally recognized that the development of the country will continue to depend on the expansion of its transportation facilities.

Owing to the lack of good roads in Argentina, passenger receipts have been relatively little affected by motor traffic, except in isolated cases. To meet the recognized danger from this source, and also as the result of the competition between individual lines, more and faster trains are being run, with improved types of sleeping cars and day coaches. Only one or two short motor coach lines are being operated by the railways. The effects of road competition will probably be felt at an early date by the Transandine Railway, as motor trips over the Andes are becoming increasingly popular during the summer months.

The efforts made by the railways to develop the fruit industry in various parts of the country are already bringing results and shipments of fruit are expected to be an important source of revenue within a few years. The improvement of crops through educational campaigns, experimental farms, supplying selected seed, etc., is also being given attention.

Very few new works were put in hand during 1930 and those already under way were as a rule either closed down or proceeded with slowly. Considerable progress was made by the Great Southern Railway with the construction of its new $15,000,000 station in Buenos Aires, as also with the erection of an 80,000-ton capacity grain elevator and other improvements in the port of Ingeniero White near Bahia Blanca. Work on the projected new station of the Central Argentine Railway in Rosario, estimated to cost $3,000,000, is still held up by litigation. The latter company has placed in service the only hump yard in Argentina, and is also completing the electrification of its suburban lines at an estimated cost of $20,000,000. The Central Argentine did some electrification work as early as 1916, since which time the Western Railway has also electrified its line in the neighborhood of Buenos Aires.

The Great Southern is experimenting with Diesel-electric trains of a new type, which are arousing much interest. They are described as "electric trains with mobile power houses," and while details have not been made public, it is anticipated that all the advantages of electrification will be obtained without the usual large investment of capital. The system is in use on some of the suburban lines, and the progress already made is stated to give every prospect of success. The possibility of operating main line trains with Diesel-electric locomotives is also under study.

Among the works recently completed may be men-

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AMERICAN BRIDGE COMPANY

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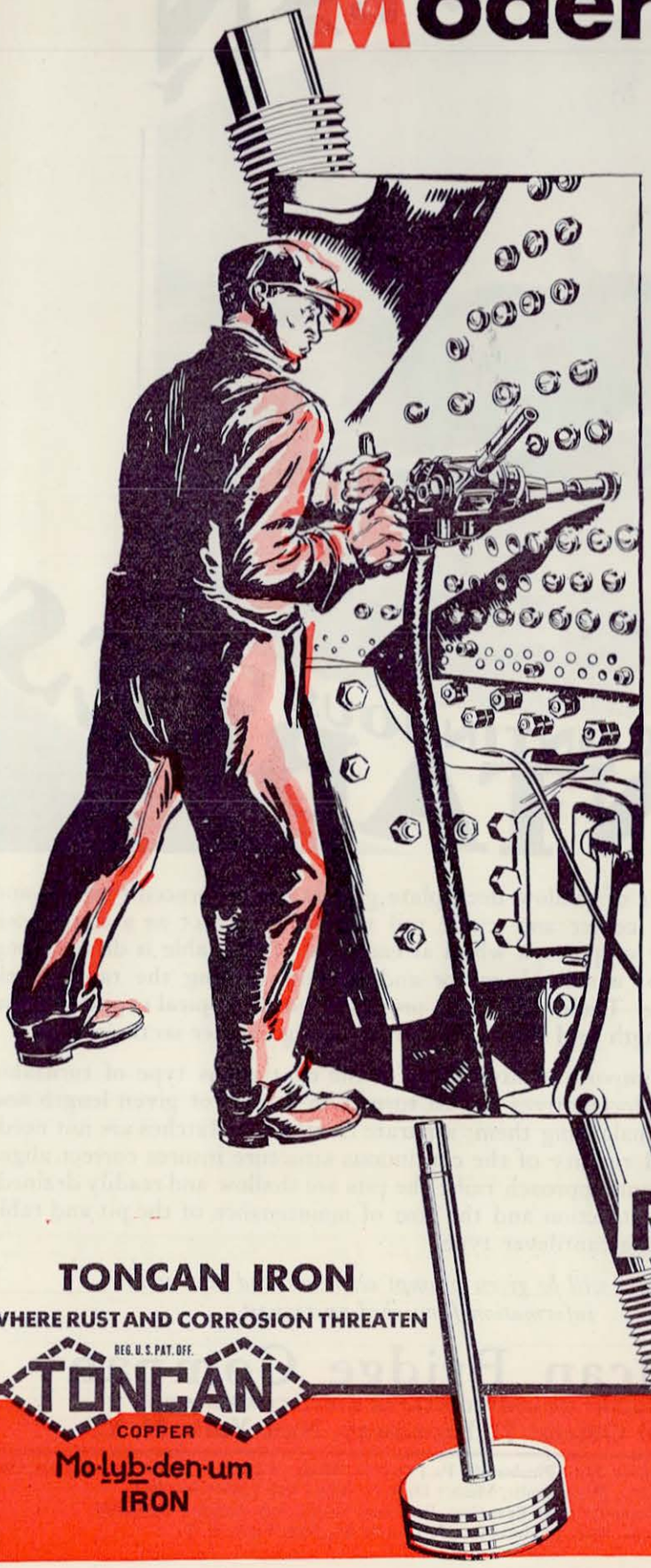
Modern Materials



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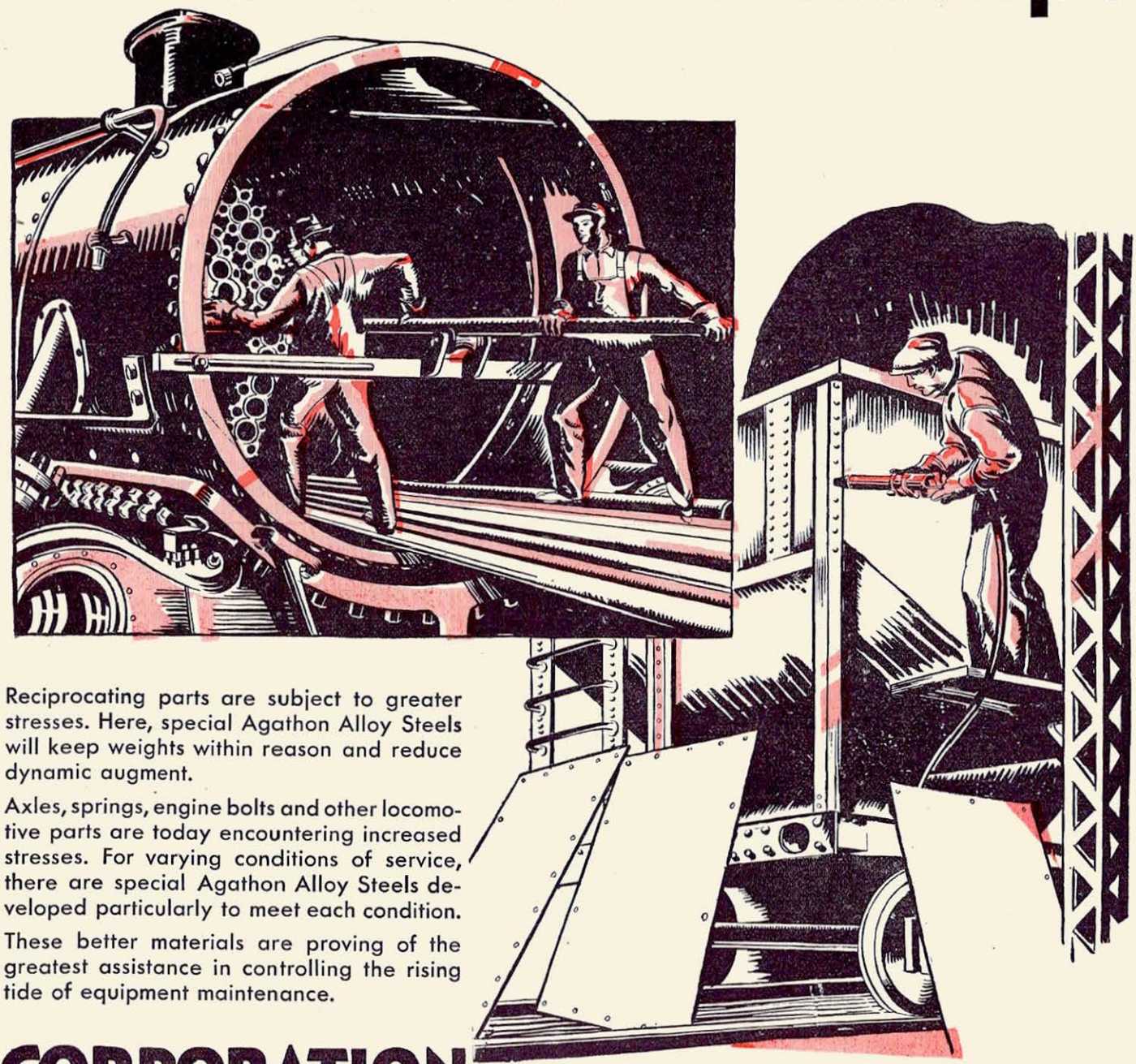

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AGATHON STEELS
TRADE MARK

tioned the construction by the Entre Rios Railways of a new freight terminal in the port of Buenos Aires, which is connected with their lines in the province of Entre Rios by a Diesel engine train ferry service operating over a distance of 113 miles on the La Plata and Parana rivers. Other train ferries cross the Parana river at Zarate and Posadas giving direct connections to Buenos Aires and Paraguay. The Entre Rios has also inaugurated a truck service to and from the rural districts around the city of Concordia, which was the first of its kind in Argentina, and has purchased additional Garratt locomotives and articulated steam rail coaches.

Construction of new lines in Argentina progressed slowly after the war. Previous to 1929 some 500 miles only had been opened to traffic, but in that year construction took an upward turn and 693 miles were added, making a total mileage of 24,164 for the entire country. The length of line placed in service during 1930 was 359 miles at the time of writing, and 534 miles more are expected to be completed within a few months, 406 by the State Railways and the remainder by the private lines. These are works for which contracts had been signed before financial difficulties arose, and no more contracts are likely to be made for the present. The various extensions which the State Railways have been constructing with company forces will presumably be affected by a recent decree of the Provisional Government ordering the suspension of all public works not already contracted for. Considerable progress has been made with the new transcontinental line from Salta to Antofagasta, 112 miles being already in service.

A project backed by American capital, which took shape during the year contemplates the construction of a system of light railways to serve a rich agricultural zone in the northern part of the province of Buenos Aires. The development of several ports on the Parana river, the erection of grain elevators, and the use of trucks, with through rates from farm to steamer, are features of the scheme, which is now awaiting the approval of the provincial government. A. F. NYE.

Colombia

The transporation system of Colombia has continued to suffer the effects of the business depression which dawned late in 1928 and became acute with the marked fall in the price of coffee, the principal export product of the country. Extensive railway construction during 1929 had been provided for in the plans laid for that year but failure to obtain the necessary foreign loans forced the suspension of government work in progress and aggravated with unemployment the bad economic situation which still obtains. During the last two years the national government has contended with an accumulating deficit but it is now believed confidently that Congress will, after a struggle of months, be able to approve a balanced budget for 1931. The unfavorable balance in the international movement of credit, visible and invisible, has effected a reduction in the gold reserves with a corresponding reduction in the paper currency in circulation. The Kemmerer Financial Commission has recently completed its work and has recommended legislation which is now being presented to Congress. Transportation, however, was not included in the studies of the Commission.

The bridge over the Magdalena river at Girardot was placed in service during the year and through service inaugurated between Bogota and Ibague which is connected with an excellent motor highway to Armenia, thence to the Pacific port of Buenaventure via the Pacific Railway; twenty-four hour service between the capital, Bogota, and the sea may be an early accomplishment. Rail connection was completed between Ambalema on the La Dorada Railway and the Tolima Railway so that through all-rail service between La Dorada, the head of lower Magdalena river navigation, and Bogota will soon be effected.

Except in the case of the Pacific Railway, little in the way of operating expense reduction was accomplished during the year. On that line the operating ratio of 92 per cent in 1928 was reduced to 80 per cent in 1929, and for 1930 will be less than 70 per cent in spite of a gross revenue decline of more than 50 per cent during the same period. Aside from the lack of operating expense control which is due primarily to a lack of efficient central administration and to the disturbing influence of politics upon the National Railways, the transportation system of Colombia, and with it the industries served, suffer the lack of even a significant beginning of tariff regulation. However, these difficulties are easily corrected and there are indications that they will be so adjusted that Colombia may soon be well upon the way to economic recovery and to the place which she should occupy in the business world.

B. B. MILNER.

Bolivia

The condition of the Bolivian railways in 1930 may be summarized as follows:

The mileage remains unchanged; construction work on the line from Cochabamba to Santa Cruz has been suspended, and the section which was completed has not been placed in service.

Construction work on the line from Potosi to Sucre is being continued and it is possible that within a few months this will be completed.

It is hoped that work will shortly be resumed on the Ferrocarril de La Paz a Yungas, which was abandoned some ten years ago, great hopes being entertained now that this work will be continued without interruption until the plains of the Rio Beni are reached and connections can be made with a navigable point on this river.

Freight traffic on the Bolivian railways has suffered an appreciable decrease, due to the general lowering of prices of metals, which constitute the principal resources of this country and are the principal commodities carried by the railroads. Until metal prices are stabilized at normal levels this recession in freight traffic will prevail.

Passenger traffic has not suffered any diminution; in fact, direct transcontinental traffic across Bolivia has continued to increase, service being maintained with all possible comforts between La Paz, Bolivia, and Buenos Aires, Argentina, twice a week, on a 90-hr. schedule.

C. TEJADA SORZANO.

Japan

During the year 1930, the general business depression has had a very unfavorable effect upon the earnings of Japanese railways, as is the case with other industries. As to the state railways, the gross revenue for the fiscal year 1930 (April, 1930-March, 1931) is expected to be about eight per cent less than that for the preceding year. It must be noted in this connection that freight traffic has been more seriously affected by the depression than passenger traffic. This decline of gross has in turn resulted in a considerable decrease of net income, and consequently the improvements to stations or yards, extension of new lines, building of rolling stock, etc., have in some measure been given up.

So far as the government railways are concerned,

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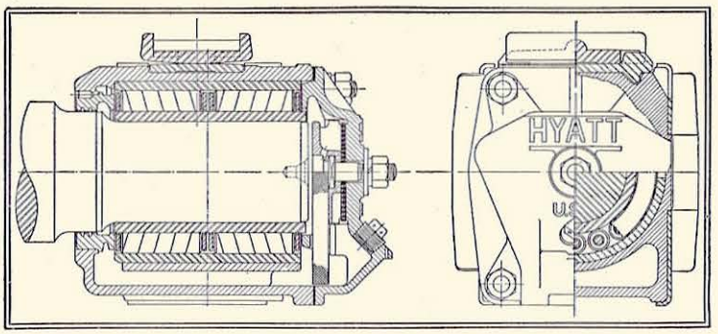

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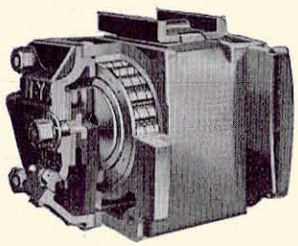

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about 80,000,000 yen ($39,872,000) was invested in roadway annually for a few years prior to 1929, and every year saw from 200 to 300 miles of new line opened for traffic. The required sum of money was obtained by issuing loans. Since the present cabinet came into power, the loan flotation has, in principle, been abandoned for this and coming years and motor transport will be started, as far as possible. The investment in the construction of new railway lines for this year has been estimated at about half that for former years, that is, no more than 40,000,000 yen ($19,936,000).

In accordance with the Ordinance of 1908, the metric system is to be adopted for weights and measures in Japan. The system has optionally been put in practice but its application will become compulsory from 1933 and 1943 on for the government and the general public, respectively. While the Japanese railways have adopted the metric unit for years for technical and other matters among themselves, they have, since April 1, 1930, introduced this unit as the basis of calculating rates and fares for the public. As a matter of course, rates and fares have been revised, the rates of the same commodities becoming higher or lower than before, according to their classes; but this revision has been made in such a way that freight revenue as a whole remains unvaried, chiefly by making reclassification of goods.

A drastic change was carried out on October 1, 1930, of train schedules on all government railway lines, the principal object in view being speeding up of the train services. Thus, 654 minutes, which was formerly required by an express train in running 601 kilometers (373 miles) between Tokio and Kobe, at the rate of 55 kilometers (34.2 miles) per hour, has been reduced to 526 minutes at the rate of 68 kilometers (42.3 miles) per hour. Considering that these figures have been realized on narrow-gage (3-ft., 6-in.) line, with many curves and grades, the train speed as mentioned above may be said to be fairly high. Speed on level sections often comes up to a figure as high as 100 kilometers (62.1 miles) per hour.

DR. S. MATSUNAWA.

China

The history of China's railways eloquently tells the history of the country. For the past 10 years, China has been torn by periodic civil wars, during which provincial and regional military chiefs have acted independently of the central government. The railways, which run through the different spheres of influence, were parceled out by these local military chiefs as their private property, and were operated, or rather abused, as the military chiefs pleased. Such continued and widespread military interference naturally has hindered railway business, with cumulative effect. Last year saw these internecine wars culminate in a most sanguinary struggle between the central government and the northern coalition, beginning early in May, with about half a million men on each side. As all the military operations were carried out along three of the most important trunk lines—the Tientsin-Pukow, the Peiping-Hankow and the Lunghai Railways—not only was traffic on these three systems entirely disrupted for more than half a year, but many locomotives and hundreds of cars, buildings and bridges were damaged. Other railways outside of the war zone were also adversely affected. As soon as hostilities stopped, rehabilitation on the railways was at once started and pushed with energy, under the personal direction of the Minister of Railways. By the end of October, all bridges in the war area, blown up or otherwise destroyed, had been repaired. Through traffic on all these lines was resumed early in November.

Railways outside the war area have, on the whole, had a fairly good year. In spite of bandits, communistic disturbances and the silver slump, a majority of the 11 government lines show increases in earnings over the previous year, the Peiping-Mukden, the Shanghai-Nanking and the Chinese Eastern being the leaders among this fortunate group. Some new construction has been continued despite most adverse circumstances. Manchuria led with the completion of several hundred miles, linking up Mukden with the capitals of Kirin and Heilungkiang provinces. Work has also been resumed on the "missing-link" of the Canton-Hankow Railway, which was first surveyed by Mr. Parsons, an American engineer, some 25 years ago. The resumption, last spring, of a coupon payment on the loan of that railway, which is the only Chinese government bond listed on the New York Stock Exchange, and the agreement made by China with the British government to utilize the Boxer indemnity for the construction of the "missing-link" seem to foretell the early completion of that urgently-needed trunk line.

In China, more than anywhere else, the personal equation is most important. Construction and proper operation of railways form a most important part of the will of the late Dr. Sun Yat-sen, founder of the republic. For carrying out that will, no better man, perhaps, could be found than Mr. Sun Fo, the present Minister of Railways at Nanking—energetic, painstaking, well-informed—who is the only son of the late Kuomintang leader. All things considered, it seems that, by the end of 1930, China's railways will at last have passed their low point, and that an upturn will probably begin with the new year.

DR. CHING-CHUN WANG.

India

Indian railways, like railways in most other countries, have been experiencing a period of decreased receipts due partly to causes which are world-wide but aggravated by political conditions in the country. When an important political party like the Congress party, definitely embarks upon a campaign of civil disobedience and boycott of foreign goods, this must have a bad effect on trade generally and the only remarkable thing is that the effect has not been worse than it is. In addition the crops in some parts of the country have been abundant with the result that prices have gone down and the cultivators have received less than if the harvest had not been quite so good.

On the other hand Indian labor and particularly labor on railways has dissociated itself from the civil disobedience campaign as they realize that they have everything to lose and little to gain by joining the Congress party.

The financial year in India ends on March 31 and for the year ending March 31, 1930, the earnings of Indian state-owned railways were about $8,500,000 or about 4½ per cent less than in the previous year. For the first 6½ months of the present financial year, i.e., up to October 25, 1930, the earnings were about 14¾ million dollars, or about 8 per cent less than in the similar period of the previous year. The decrease is due to decreased loadings of all commodities, namely coal, grain, oil-seeds, cotton, l. c. l. and miscellaneous full carloads. Loadings of coal are down in spite of the fact that long distance coal rates were reduced during the last financial year.

As the interest rates for raising new money are unfavorable, expenditure on new construction has been rigorously curtailed and steps taken to expedite the completion of urgent works under way rather than embarking on any new projects.

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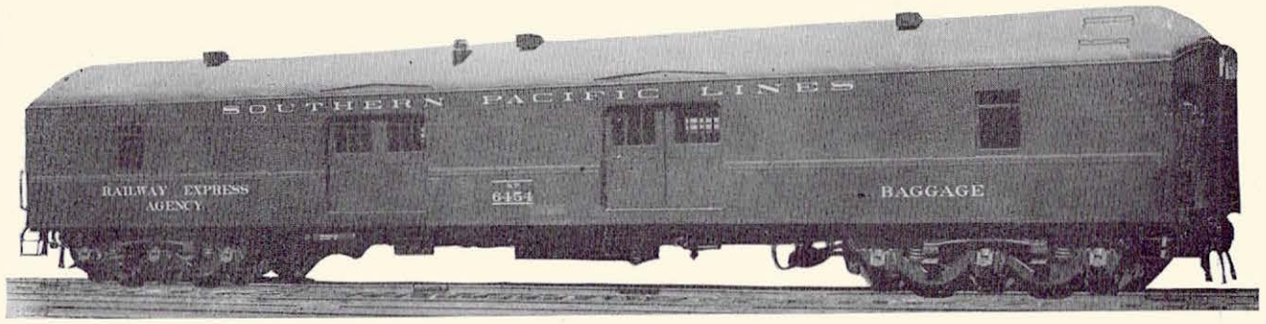

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Expenditure on maintenance has been very carefully scrutinized while operating charges have been reduced by an overhauling of the time table. The standard of maintenance on Indian railways has been high in recent years and many projects have been carried out to improve operation so that it is possible to slow down for a time without any permanent ill effects. The decisions arrived at at the Round Table Conference, which opened on November 12, between representatives of India and England concerning the future constitution of India, will have far reaching effects on the prospects of Indian railways during 1931 and succeeding years.

New Zealand

In New Zealand the increasing use of highway motor vehicles for common carrier as well as private purposes, while indicative of the general tendency towards a fuller utilization of all available means of transport than ever before, is at the same time decreasing the proportion of traffic carried by rail. The railways here, being government-owned and under one management, might have been expected to receive some special protection in view of the fact that the Dominion as a whole must bear the cost of any loss which occurs from their operation, but up to the present no such protection has been granted them. Rather have they been left to fight their own battles against the encroachment of highway operators, and at the same time have been required to carry on certain services for the State at unremunerative rates and even to employ a surplus staff in order to help government measures for the relief of unemployment. The result of this has been to restrict very definitely their developmental finances, and to leave but a small margin for those improvements in services which are found, on privately owned lines elsewhere, to be the best means of meeting and defeating the extension of competitive highway operations.

The principal developments of the past year have been: (1) the introduction of new modern coaches on faster-scheduled expresses, such as the "Rotorua Limited" which runs between our largest city, Auckland, and Rotorua, the world-famous thermal district of New Zealand's northern island; (2) the closing down of certain branch lines in order to reduce recurrent losses which have been sustained as a result of operating them; (3) an economy campaign to reduce operating costs generally, including research into fuels and fueling methods on steam locomotives, new workshops and production methods for the manufacture and repair of rolling stock and locomotives, increased use of three-color light signaling to reduce labor costs for tablet stations and substantial expenditures on grade easements and cut-offs to decrease train operating expenses; (4) the development of railway-owned highway services for handling suburban passenger traffic in suitable areas, with consequent reductions in train operating costs during slack periods of the day; (5) collection and delivery arrangements and contracts with independent highway operators and adjustments of rates in areas where road competition is developing, in order to checkmate such competition; (6) the discontinuance of work on all developmental lines excepting such as would make through connection between existing branch lines and arterial routes, and (7) arrangements for rate increases on unremunerative traffic which can bear loading without coming up to the competitive level.

A noteworthy development was the establishment of a Ministry of Transport, to examine the relative fields for railways and highway operations and to introduce legislation that might be effective in reducing the cost of transport to the country as a whole and in eliminating wasteful competition. A recent analysis of figures of rail and highway operations in this country indicates that while there is a capital of £58,000,000 invested in railways, the capital cost of road services is estimated at £48,000,000 and of roads at £60,000,000, making a total of £108,000,000 devoted to services other than rail. These figures indicate the extent to which active motor vehicle operation has developed in this country. Railway passenger traffic has shown a considerable decline in recent years, to which the year just ended was no exception. The steady increase in railway freight traffic, however, is a hopeful sign and confirms the impression that for bulk traffic over the longer distances the railways are more than holding their own.

GEORGE G. STEWART.

South Africa

The wave of depression spreading throughout the world has naturally had an effect upon the state-owned South African railways, although its influence has not been felt to the same extent as in other parts of the world, largely because of the fact that the great gold-mining industry of the Witwatersrand has continued to thrive, while other mining and agricultural industries have suffered. The effects of the depression were first noted in December, 1929, and the recession reached its most acute stage about the middle of 1930. Since then the railway earnings have continued proportionate to those of last year, with no further decrease. With a view to increasing revenue from passenger traffic the Administration has introduced revised excursion rates.

The gradual growth of competitive road transport has also adversely affected railway revenue, although in this connection the great distances that separate the larger centres, and the introduction of legislation providing for increased dock charges on freight landed at the ports and destined for conveyance by other means than rail, have caused a realization by those concerned of the benefits to be derived from the utilization of the railways. As a result the initial losses are not continuing.

With the exception of a railway tapping the great manganese deposits at Postmasburg, about 130 miles from Kimberley, few new lines have been authorized since the 1925 program (886 miles), now nearing completion, the Administration relying for the future principally upon the extension of its highway motor transport system to open up the districts not previously served with regular means of transport. The open route mileage of the motor transport system increased from 9,285 on March 31, 1929, to 11,690 on October 31, 1930.

During the year the Administration introduced a new type of articulated locomotive, which is the largest and most powerful operating on a 3-ft., 6-in. gage anywhere in the world. It weighs 214 tons and has a tractive effort of 78,650 lb. In addition, several new coaches were placed in service on branch lines, while increased programs of rolling stock construction in railway shops were launched.

As a result of the continued growth of tourist traffic, the tourist and publicity departments were consolidated during the early part of the year, the new department being renamed the Publicity and Travel Department. As a result of this reorganization, visitors to South Africa are now afforded greater facilities, and conditions pertaining to passenger travel generally have reached a particularly high standard.

Indications generally point to the fact that the most serious effects of the depression have been weathered, and there is every reason to hope for improved conditions during the coming year.

N. B. HEWITT.

News Department Appears on Next Left Hand Page

BETTER FIRES

FIREBAR CORPORATION
CLEVELAND OHIO.

NEWS

I. C. C. Reports on Barge Line Application

The Interstate Commerce Commission has issued a supplemental report on the application of the Mississippi Valley Barge Line, requiring railroads to join it in through routes and joint rates between points in Central territory and Southwestern territory, via Cincinnati, Ohio, and Vicksburg, Miss., and broadening the circuity limitation prescribed in connection with through routes previously required.

Frisco Establishes Two-Cent Coach Fare

The St. Louis-San Francisco has received permission from the Interstate Commerce Commission to file table tariffs which will establish a coach fare equal to approximately two cents a mile. The low rate will be effective after February 1, and will be good between all points on the system and on the Fort Worth & Rio Grande. Tickets will be good in coaches and present baggage provisions will be maintained.

Motor Truck Movement of Live Stock Increases

Receipts of live stock in the Kansas City market by motor truck during November, exceeded receipts by rail for the first time, according to a recent statement issued by the National Automobile Chamber of Commerce. The statement quotes the market record as revealing that 75,115 head of live stock were received at Kansas City by truck during November as against 64,037 head received by rail. The foregoing motor truck receipts were 13 per cent more than for the corresponding month of 1929.

Four Roads Inaugurate Improved Passenger Service to Coast

Improved passenger train service, which involves a material shortening of schedules and better equipment, will be established by the Western Pacific, the Denver & Rio Grande Western, the Chicago, Burlington & Quincy and the Missouri Pacific between San Francisco Bay points and Chicago, and between San Francisco Bay points and St. Louis on January 4. The new service between San Francisco and Chicago involves the Western Pacific, the Denver & Rio Grande Western and the Burlington, via Denver, while that between San Francisco and St. Louis involves the Western Pacific, the Denver & Rio Grande Western and the Missouri Pacific, via Pueblo. According to an announcement made by the Western Pacific, this improvement in service is made possible by heavy expenditures by the Denver & Rio Grande Western during the past six or seven years in improving roadway and motive power and also by the large amounts which have been expended by the Western Pacific for the improvement of roadway and equipment following the acquisition of control of the Western Pacific by Arthur Curtiss James in 1926. The Western Pacific also plans to put on an additional train between San Francisco Bay points and Reno, Nev., via the Feather River Canyon, the train to be known as the "Feather River Express."

EQUIPMENT

THE NORTHERN PACIFIC has placed a contract with the Pacific Car & Foundry Company for the construction of steel sills, frames and cross members for 1,000 refrigerator cars, which will be built in the railroad's shops at South Tacoma, Wash.

CONSTRUCTION

BOSTON & MAINE.—The Public Service Commission of New York has designated for elimination the Pease crossing of this company's line, located near Buskirk station in Hoosic, N. Y. The crossing will be eliminated by carrying the highway under the railroad at a point about 260 feet east of the present crossing, at an estimated cost of $134,000, exclusive of land and damages.

NEW YORK CENTRAL.—The New York Public Service Commission has ordered the reconstruction of the highway bridge carrying the Buffalo highway over this company's tracks about two miles east of Churchville, in the town of Riga, N. Y. A new bridge will be built just west of the present structure at an estimated cost of $193,045. The Commission has also designated for elimination the Goldens Bridge station, the Stor and the Quicks crossings of the New York Central in Lewisboro, N. Y. The crossings, which are located just north of Goldens Bridge station, will be eliminated by constructing overcrossings at Stor and Quicks crossings and by closing Goldens Bridge station crossing and constructing an overhead foot bridge. The estimated cost of the project is $255,000.

RAILWAY FINANCE

CASEY & KANSAS.—*Stock.*—This company has been granted authority by the Interstate Commerce Commission to issue not exceeding $91,100 of its common stock, consisting of 911 shares of the par value of $100 each, to be delivered to I. N. Coolley and William C. Price in payment for the property of the Westfield Railroad Company, extending from Casey to Kansas, Ill., 19 miles, and for other corporate purposes.

RAILWAY OFFICERS

Charles T. O'Neal, vice-president in charge of operation of the Buffalo, Rochester & Pittsburgh, with headquarters at Rochester, N. Y., has been elected president of the Chicago & Eastern Illinois, with headquarters at Chicago, effective January 1, succeeding **Thomas C. Powell,** who has been elected chairman of the board of directors.

George W. Wood, assistant general freight agent of the Chesapeake & Ohio at Chicago, has been promoted to general through freight agent at Cincinnati, Ohio, succeeding **R. H. Vaugh,** who retired from active service at his own request on January 1. **A. M. Glassmeyer,** general western freight agent, has been appointed assistant general freight agent, with headquarters as before at Cincinnati. **H. S. Stark,** commercial agent at St. Louis, Mo., has been promoted to assistant general freight agent at Chicago, succeeding Mr. Wood.

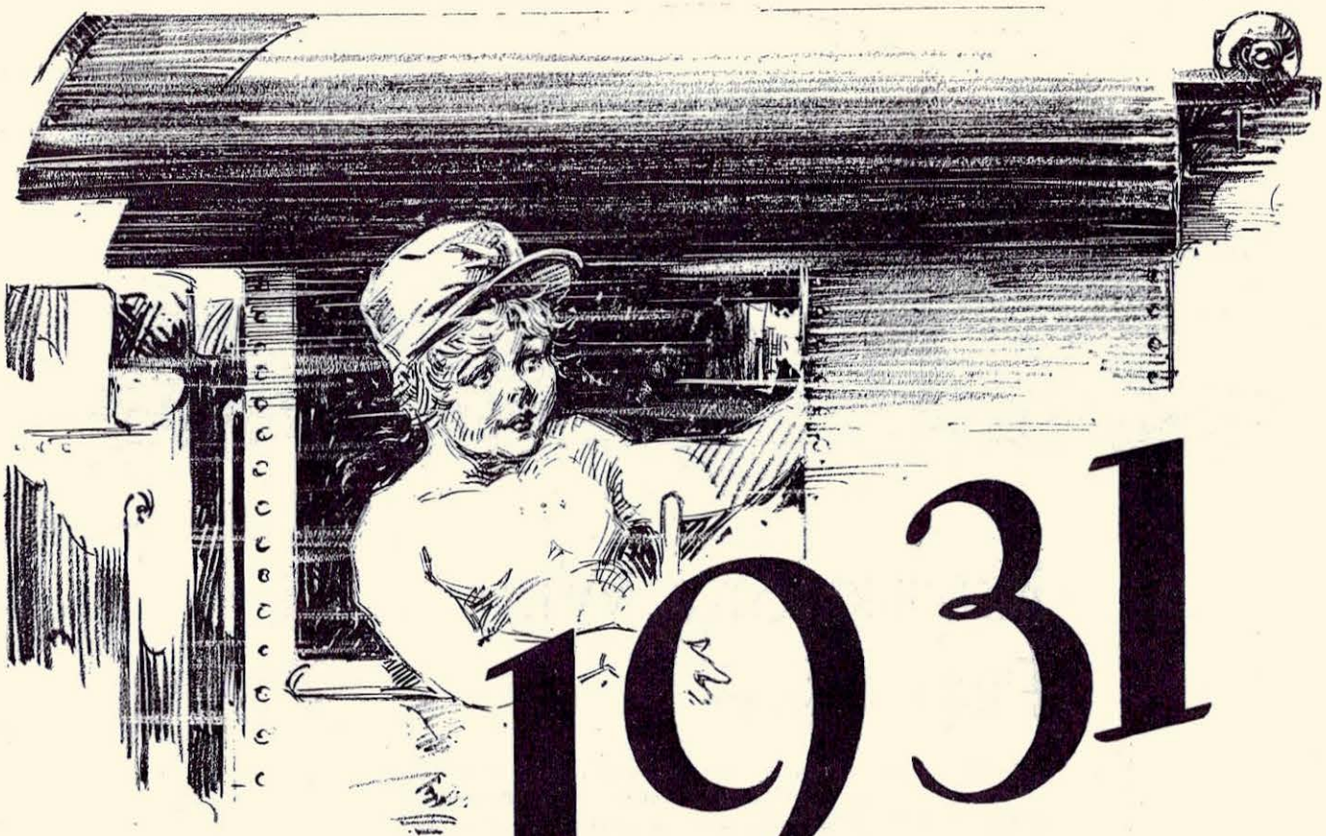
OBITUARY

George H. Campbell, assistant to the president of the Baltimore & Ohio, died on December 25 at his home in Roland Park, Md.

Edward C. Carter, chief engineer of the Chicago & North Western, with headquarters at Chicago, died of double pneumonia at Evanston, Ill., Dec. 23.

Walt Dennis, superintendent of the New Jersey, Indiana & Illinois, with headquarters at South Bend, Ind., died at Kansas City, Kan., on December 6 from a heart attack.

H. E. Allen, superintendent of the Dakota division of the Chicago, Rock Island & Pacific, with headquarters at Estherville, Iowa, died on a Rock Island train near El Reno, Okla., on December 24, while enroute from Hot Springs, Ark., to Estherville.



1931

Will have to hit the ball

TO insure dependable operation, maximum efficiency and lower repair costs, make sure that all your locomotives are equipped this year with the HUNT-SPILLER *Air Furnace* GUN IRON Wearing Parts listed at the bottom of this page.

HSGI
Reg. U. S. Trade Mark

Cylinder Bushings
Cylinder Packing Rings
Pistons or Piston Bull Rings
Valve Bushings
Valve Packing Rings
Valve Bull Rings
Crosshead Shoes
Hub Liners
Shoes and Wedges
Floating Rod Bushings

Parts Finished for Application

Dunbar Sectional Type Packing
Duplex Sectional Type Packing
(Duplex Springs for Above Sectional Packing)
Cylinder Snap Rings
Valve Rings All Shapes

HUNT-SPILLER MFG. CORPORATION
J. G. Platt, Pres. & Gen. Mgr. V. W. Ellet, Vice-President

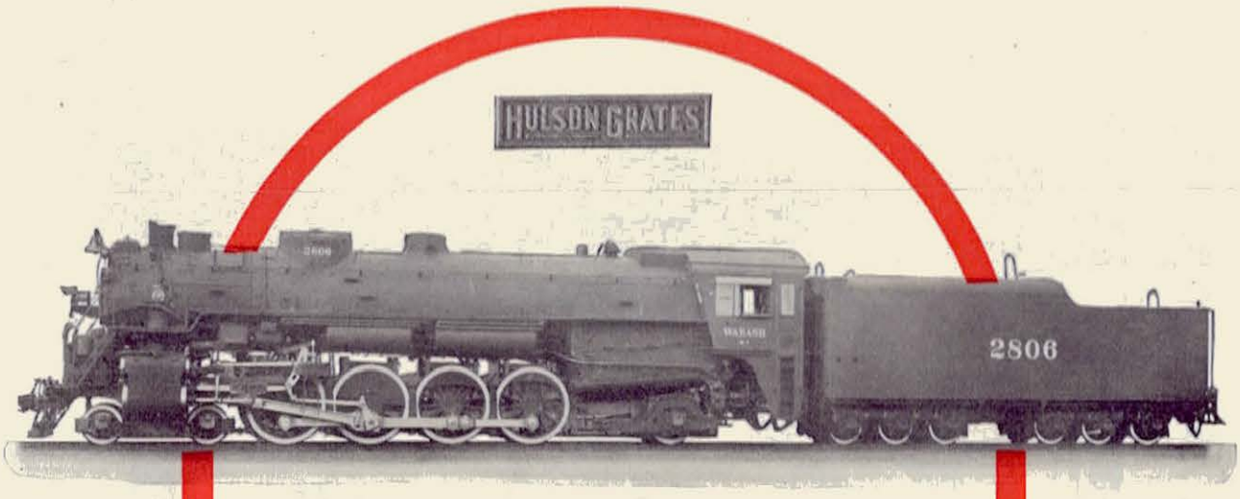
Office & Works

383 Dorchester Ave. South Boston, 27, Mass.

Canadian Representative: Joseph Robb & Co., Ltd., 997 Aqueduct St., Montreal, P. Q.
Export Agent for Latin America:
International Rwy. Supply Co., 30 Church Street, New York, N. Y.

HUNT-SPILLER GUN IRON

Air Furnace



KEEPING STEP WITH PROGRESS—

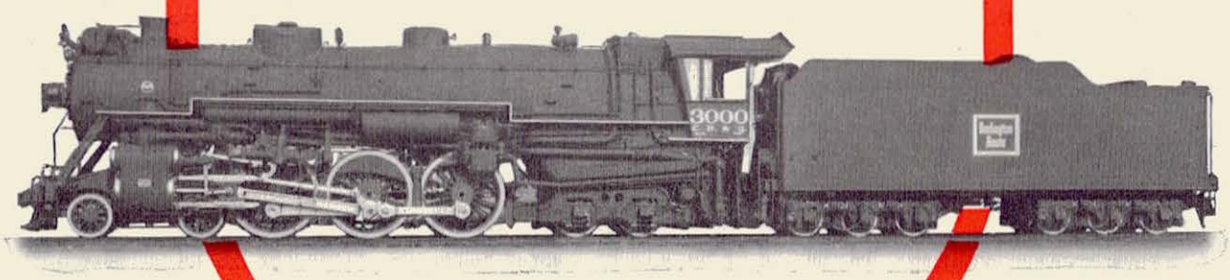
THE new power for the Wabash and Burlington installed in 1930, was designed and purchased to meet new traffic demands.
Hulson TUYERE TYPE Grates were specified—after test.
The successful performance of this baffled air admission grate surface in meeting new coal and fire-box conditions, merits your consideration of their specification for your new power.
The same results are available for existing power—

BETTER FUEL PERFORMANCE
LONGER ENGINE RUNS
and
LOW MAINTENANCE

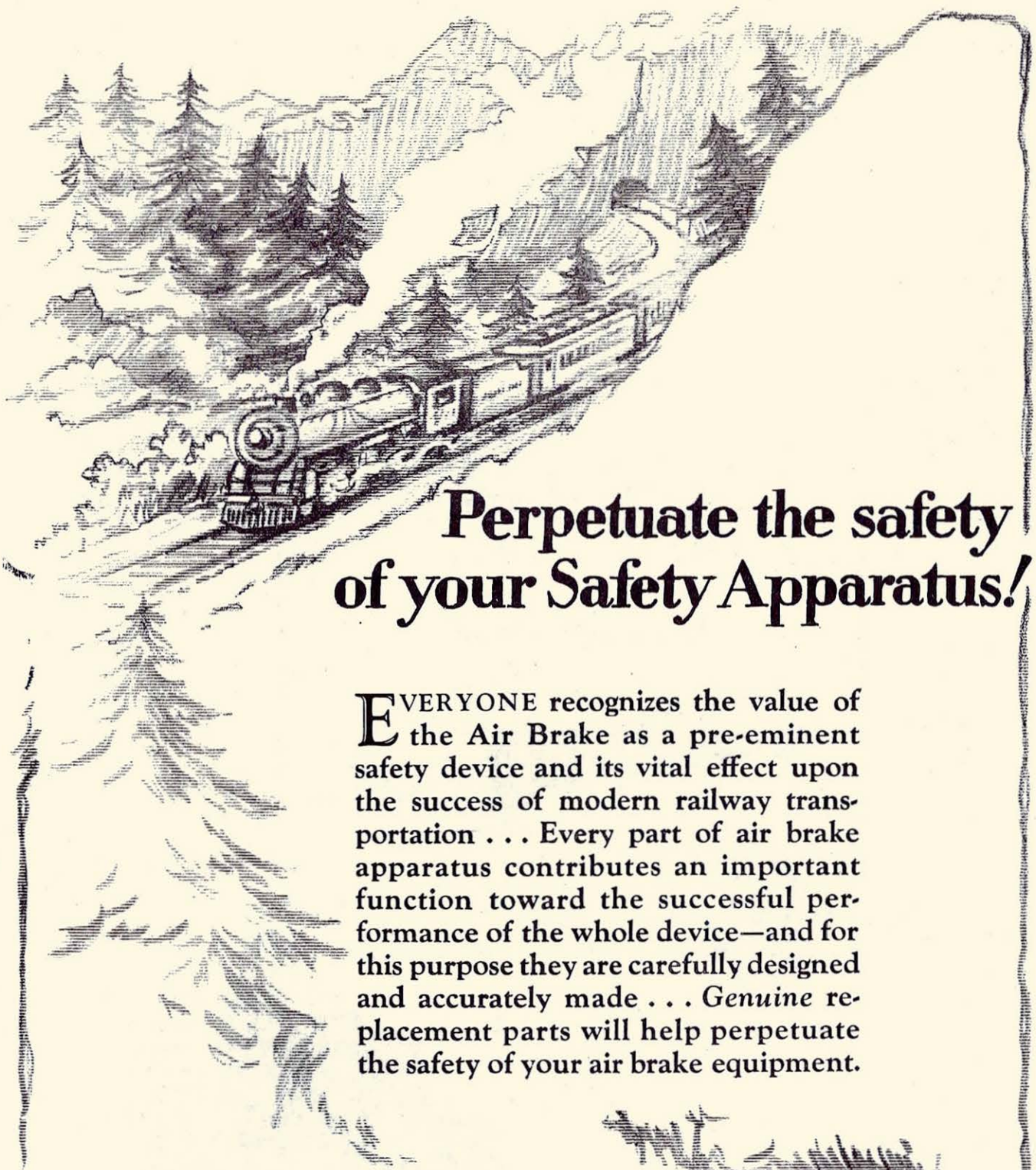
Hulson TUYERE TYPE Grates are in service on 24 roads, in both old and new power, in all classes of service.
Write us for the complete story on Hulson Grate performance and economies.

HULSON GRATE COMPANY

(INCORPORATED)
KEOKUK, IOWA

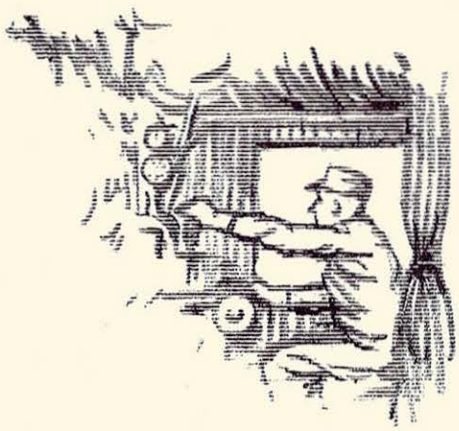


REG US PAT OFF
TRADE HULSON GRATES MARK



Perpetuate the safety of your Safety Apparatus!

EVERYONE recognizes the value of the Air Brake as a pre-eminent safety device and its vital effect upon the success of modern railway transportation . . . Every part of air brake apparatus contributes an important function toward the successful performance of the whole device—and for this purpose they are carefully designed and accurately made . . . *Genuine* replacement parts will help perpetuate the safety of your air brake equipment.

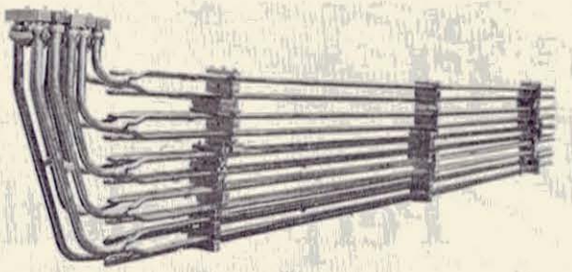


WESTINGHOUSE AIR BRAKE CO.

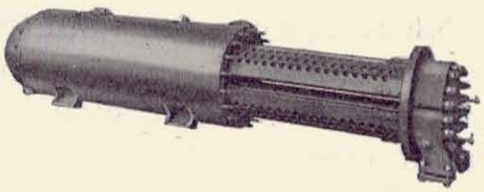
« General Office and Works »

WILMERDING, PA.

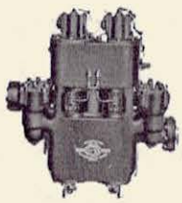
Two Important



Typical Type "E" Superheater Assemblies



The Elesco Heater Showing Tubes Partly Withdrawn



CF TYPE
Elesco boiler-feed pump

Reducers

OF TON MILE COSTS

Elesco superheaters and Elesco feed water heaters reduce ton mile costs in two important ways; first, by increasing boiler capacity; second, by reducing fuel costs.

Together they provide an increase in boiler capacity of at least 40 per cent over a saturated steam boiler of similar dimensions. This is an important factor, since, under all operating conditions, train speeds are determined by the sustained locomotive boiler capacity.

And this increased boiler capacity is obtained without additional fuel cost—another cost reducing factor.

Elesco superheaters and Elesco feed water heaters are standard equipment on many railroads. They provide increased boiler capacity—higher sustained train speeds—decreased ton mile costs.

THE SUPERHEATER COMPANY

60 East 42nd Street
NEW YORK

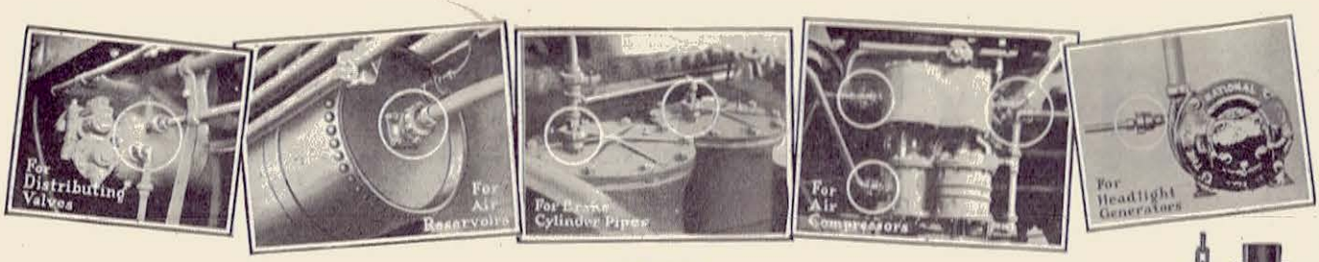
ELESCO

Peoples Gas Building
CHICAGO

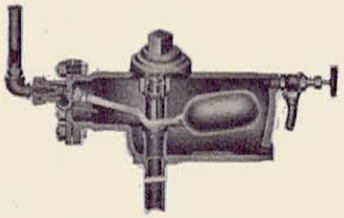
CANADA: The Superheater Company, Limited, Montreal

Feed Water Heaters Superheaters Exhaust Steam Injectors
Superheated Steam Pyrometers

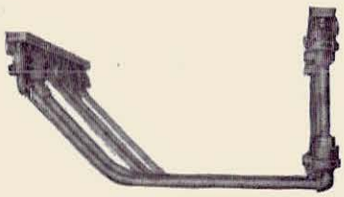
A-540



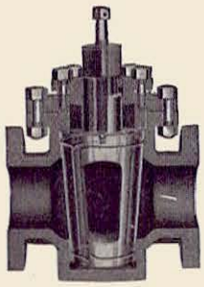
BARCO
Flexible Joints in Locomotive Piping



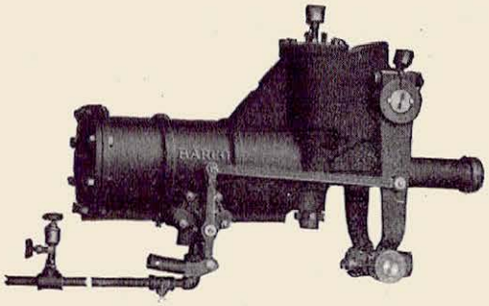
Cleveland Float Low Water Alarm



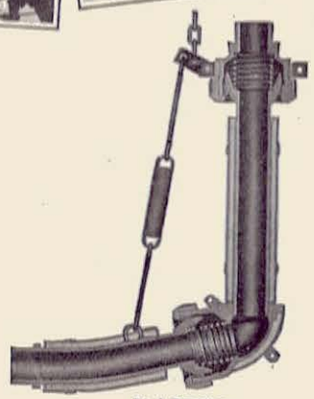
BARCO Engine-Tender Connections



BARCO Lubricated Plug Valve



BARCO Power Reverse Gear



BARCO Metallic Car Steam Heat Connections

Make 1931 A Better Year

THERE is no room for waste in 1931 appropriations. Every dollar spent for new equipment must do its share toward improving efficiency and reducing maintenance costs.

BARCO Railway Devices will help you solve many expensive problems—reduce costs—prevent failures—save time, labor and fuel—increase the efficiency of your locomotives, passenger cars, train sheds, coach yards and engine terminals.

Make 1931 a better year. Specify BARCO Railway Devices and use the savings for dividends or the purchase of additional equipment.

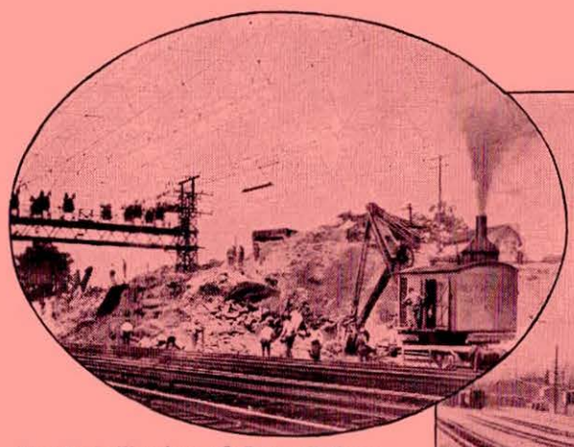
Barco Manufacturing Co.

1801 Winnemac Avenue, Chicago, Illinois
THE HOLDEN CO., LTD.

In Canada
Montreal—Moncton—Toronto

In Canada
Winnipeg—Vancouver

BARCO
Railway Devices



New York, Westchester & Boston Railway
Extension from Larchmont to Mamaroneck, N.Y.
First Engagement
1925

New York, Westchester & Boston Railway
Extension from Rye to Portchester, N.Y.
Fourth Engagement
1929

60% Repeat Orders...

OVER 60% of our work for railroads has been repeat orders—a significant fact to those contemplating new shops, terminals and power plants.

Railroads we have served more than once—with the number of major authorizations—are as follows:

Atlantic Coast Line Railroad 2
Baltimore & Ohio Railroad 4
Boston and Maine Railroad 4
Canadian Pacific Railway 4
Central Railroad of New Jersey 4
Chesapeake & Ohio Railway 3
Chicago, Burlington & Quincy Railroad 2
Chicago, Rock Island & Pacific Railway 3
Chicago & Alton Railroad 2
Erie Railroad 2
Lehigh Valley Railroad 5
Missouri Pacific Railway 4
New York, New Haven & Hartford Railroad 3
New York, Westchester & Boston Railway 5
Pennsylvania Railroad 9
Southern Railway 6
Terminal Railroad Association of St. Louis 3
Wabash Railway 3

UNITED ENGINEERS & CONSTRUCTORS

INCORPORATED

DWIGHT P. ROBINSON, PRESIDENT

PHILADELPHIA NEW YORK NEWARK BOSTON CHICAGO
LOS ANGELES MONTREAL TORONTO BUENOS AIRES RIO DE JANEIRO

MAXIMUM RETURN TO CLIENTS PER DOLLAR INVESTED

1931

EXPENDITURES for railway signaling equipment are justified by the economies brought about through the use of:

AUTOMATIC BLOCK SIGNAL SYSTEMS

Reduce train delays and so reduce operating costs.

CENTRALIZED TRAFFIC CONTROL SYSTEMS

Reduce the delays inherent in the use of train orders through directing the movement of trains by signal indications and reduce train stops through the power operation of switches.

C.T.C. systems show the greatest operating efficiency per dollar of investment and are ideal for single-track lines and for either-direction operation on multiple-track lines.

INTERLOCKINGS

Reduce delays at terminals, grade crossings and junctions and by the use of power interlocking, extend the territory which may be covered by a single interlocking station.

REMOTE POWER SWITCHES

Reduce the number of stops (otherwise unnecessary) to throw switches by hand and so save time and coal.

CAR RETARDERS

Reduce classification yard delays and yard operating costs.

BEREA COLLEGE LIBRARY
No.
BEAVER FALLS, PA.

An extensive use of railway signaling systems insures an intensive use of railway facilities.

UNION SWITCH & SIGNAL COMPANY
Swissvale, Pennsylvania

GENERAL RAILWAY SIGNAL COMPANY
Rochester, New York